AD-A156 495 RESERVOIR CONTROL CENTER: ACTIVITIES AND ACCOMPLISHMENTS OF THE SOUTHWEST..(U) CORPS OF ENGINEERS DALLAS TX SOUTHWESTERN DIV JAN 81 1/2

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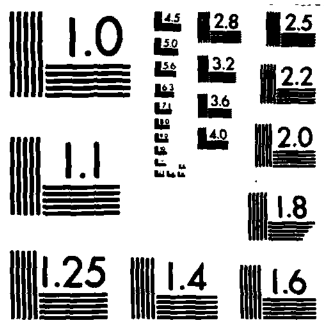

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Southwestern Division

(3)

Reservoir Control Center

AD-A156 495

PART II OF THE
ANNUAL REPORT
1980

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USArmy Corps of Engineers
Southwestern Division
Dallas, Texas

January 1981

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report presents activities and accomplishments of the Southwestern Division (SWD) related to reservoir regulation and water management through FY 1980. ~~Companion~~ publications, "Parts II and III of the "Annual Report", have been prepared containing detailed summaries of the districts, and minutes of coordinating committee meetings, and instream flow problems and needs evaluation, respectively.

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PART I

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MONTHLY DISCHARGE FREQUENCY AND DURATION CURVES

PART II

RESERVOIR CONTROL CENTER

1980 ANNUAL REPORT

SECTION IV - STATUS OF RESERVOIR WATER CONTROL MANUALS IN SWD

STATUS OF WATER CONTROL MANUALS IN SWD
(Report Control Symbol DAEN-CWE-16)

Revised: 1 January 1981

RESERVOIR	STREAM	OWNER	DIST	WATER CONTROL MANUAL SUBMITTED	SCHEDULED THRU FY 83	APPROVED
<u>White Riv Master</u>		CE	LRD	Dec 54 F		Dec 55 OCE
Beaver	White Riv Basin	CE	LRD	Oct 66 F		Jan 67 OCE
Table Rock	White Riv Basin	CE	LRD	Oct 66 F		Jan 67 OCE
Bull Shoals	White Riv Basin	CE	LRD	Oct 66 F		Jan 67 OCE
Norfork	White Riv Basin	CE	LRD	Oct 66 F		Jan 67 OCE
Clearwater	Black River	CE	LRD	Jan 73 U	Sep 81 R	Feb 73 SWD R*
Greers Ferry	Little Red River	CE	LRD	Oct 65 F		Jun 66 OCE
<u>Arkansas Master</u>		CE	AD	Apr 69 F		Jun 70 OCE
Pueblo (1)	Arkansas River	BR	AD	Dec 77 F		Feb 79 SWD
Trinidad	Purgatorie River	CE	AD	Jul 78 F		Oct 79 SWD
John Martin	Arkansas River	CE	AD	Jun 59 F	Nov 81 R	Feb 60 OCE
<u>Arkansas Master</u>		CE	TD	Apr 76 U		Sep 80 SWD
Cheney (1)	N. F. Ninnescah	WPRS	TD	Oct 65	Jun 83 R	Mar 66 OCE AR
El Dorado	Walnut River	CE	TD		Aug 81	
Kaw	Arkansas River	CE	TD	Dec 77 F		Jan 78 SWD
Great Salt Plains	Salt Fork Ark	CE	TD	Nov 66 F		Apr 67 OCE
Keystone	Arkansas River	CE	TD	Nov 63		Apr 65 OCE
Heyburn	Polecat Creek	CE	TD	Jan 57		Feb 62 OCE AR
Verdigris System						
Toronto	Verdigris River	CE	TD	Jun 66 F		Aug 66 OCE
Fall River	Fall River	CE	TD	Jun 66 F		Aug 66 OCE
Elk City	Elk River	CE	TD	Jun 66 F		Aug 66 OCE
Big Hill	Big Hill Creek	CE	TD		Oct 81	
Oologah	Verdigris River	CE	TD	Dec 75 U		Jan 76 SWD AR
Hulah	Caney River	CE	TD	Oct 68		Jun 69 OCE AR
Copan	Caney River	CE	TD		Dec 81	
Birch	Bird Creek	CE	TD	Nov 77 P	Jun 81	Mar 78 SWD R*
Skiatook	Homing Creek	CE	TD		Jun 83	

STATUS OF WATER CONTROL MANUALS IN SWD

RESERVOIR	STREAM	OWNER	DIST	WATER CONTROL MANUAL SUBMITTED	SCHEDULED THRU FY 83	APPROVED
Upper Grand Sys						
Council Grove	Neosho River	CE	TD	Apr 74 F		May 74 SWD
Marion	Cottonwood River	CE	TD	Jul 74 F		Aug 74 SWD
John Redmond	Neosho River	CE	TD	Sep 76 R		
Pensacola (1)	Neosho River	GRDA	TD	Sep 64	Aug 82 R	Mar 65 OCE AR
Markham Ferry (1)	Neosho River	GRDA	TD	Sep 64	Jul 82 R	Mar 65 OCE AR
Fort Gibson	Neosho River	CE	TD	Sep 64	Sep 82 R	Mar 65 OCE AR
Tenkiller Ferry	Illinois River	CE	TD	Jul 76		Mar 77 SWD
Conchas	Canadian River	CE	AD	Jun 67 F		Jan 68 OCE
Sanford (1)	Canadian River	WPSR	TD	Sep 65	Nov 82 U	Feb 66 OCE AR
Norman (1)	Little River	WPSR	TD	Feb 65 F		Nov 65 OCE
Optima	N. Canadian River	CE	TD	Dec 69		Feb 70 SWD AR
Fort Supply	Wolf Creek	CE	TD	Dec 69		Feb 70 SWD AR
Canton	N. Canadian River	CE	TD	Dec 69		Feb 70 SWD AR
Eufaula	Canadian River	CE	TD	Sep 62 F	Jul 83 R	Nov 63 OCE
Newt Graham PT VI, L&D 18	Arkansas River	CE	TD	Apr 72 F		Jun 72 SWD
Chouteau PT V, L&D 17	Arkansas River	CE	TD	Apr 72 F		Jun 72 SWD
Webbers Falls PT IV, L&D 16	Arkansas River	CE	TD	Jul 72 F		Jul 72 SWD
R. S. Kerr PT III, L&D 15	Arkansas River	CE	TD	Apr 72 F		Apr 72 SWD
W. D. Mayo PT II, L&D 14	Arkansas River	CE	TD	Oct 72		Jan 73 SWD AR
Wister	Poteau River	CE	TD	Mar 74 F		Jun 74 SWD
Blue Mountain	Petit Jean	CE	LRD	Feb 68 F	Sep 83 R	Mar 68 OCE
Nimrod	Fourche La Fave	CE	LRD	Sep 67 F		Mar 68 OCE
Lock & Dam 13	Arkansas River	CE	LRD	Sep 74 F		Sep 74 SWD
Ozark-Jeta Taylor	Arkansas River	CE	LRD	Sep 74 F		Sep 74 SWD
Dardanelle	Arkansas River	CE	LRD	Mar 76 F		Apr 76 SWD
Lock & Dam 9	Arkansas River	CE	LRD	Mar 76 F		Apr 76 SWD
Lock & Dam 8 Toad Suck Ferry	Arkansas River	CE	LRD	Jul 74 F		Sep 74 SWD
Lock & Dam 7 Murray	Arkansas River	CE	LRD	Jul 74 F		Sep 74 SWD
Lock & Dam 6 David D. Terry	Arkansas River	CE	LRD	Oct 71 F		Sep 74 SWD

STATUS OF WATER CONTROL MANUALS IN SWD

RESERVOIR	STREAM	OWNER	DIST	WATER CONTROL MANUAL SUBMITTED	SCHEDULED THRU FY 83	APPROVED
Lock & Dam 5	Arkansas River	CE	LRD	Oct 71 F		Sep 74 SWD
Lock & Dam 4	Arkansas River	CE	LRD	Oct 71 F		Sep 74 SWD
Lock & Dam 3	Arkansas River	CE	LRD	Oct 71 F		Sep 74 SWD
Lock & Dam 2	Arkansas River	CE	LRD	Oct 71 F		Sep 74 SWD
Red River Master		CE	TD	Nov 62	Sep 83 R	Feb 63 OCE AR
Altus (1)	N. Fork Red	WPRS	TD	Dec 67 F		Oct 68 OCE
Mountain Park (1)	Otter Creek	WPRS	TD	Jan 76		Mar 76 SWD R*
Lake Kemp (1)	Wichita River	WCID	TD	May 73		Jun 73 SWD
Waurika	Beaver Creek	CE	TD	Apr 77		Apr 77 SWD
Foss (1)	Wachita River	WPRS	TD	Feb 61 F		May 61 OCE
Fort Cobb (1)	Cobb Creek	WPRS	TD	Jan 60 F		Mar 61 OCE
Arbuckle (1)	Rock Creek	WPRS	TD	Nov 66		Sep 67 OCE AR
Texoma	Red River	CE	TD	Jun 75 P		Nov 75 SWD R*
Pat Mayse	Sanders Creek	CE	TD	Dec 66 F		Oct 67 OCE
Clayton	Jackfork Creek	CE	TD		Sep 81	
Hugo	Kiamichi River	CE	TD	Jan 74 P	Mar 81	Feb 74 SWD R*
Little Riv Sys						
Pine Creek	Little River	CE	TD	May 74 R		Jul 74 SWD AR
Lukfata	Glover Creek	CE	TD			
Broken Bow	Mountain Fork	CE	TD	Jul 74 R		Nov 74 SWD
DeQueen	Rolling Fork	CE	TD	May 76 F		Jun 76 SWD
Gillham	Cossatot River	CE	TD	Mar 67	Dec 80 R	Jun 68 OCE AR
Dierks	Saline River	CE	TD	Jun 75		Apr 76 SWD
Millwood	Little River	CE	TD	Sep 73 F		Nov 73 SWD
<u>Sulphur Riv Master</u>						
Cooper	Sulphur River	CE	FWD			
Wright Patman	Sulphur River	CE	FWD	Sep 74	Nov 80 R	Nov 74 LMVD
Lake O' The Pines	Cypress Creek	CE	FWD	Jun 74	Sep 81 R	Nov 74 LMVD
<u>Neches Riv Master</u>		CE	FWD	May 62	Apr 83 R	Mar 63 OCE AR
B. A. Steinhagen	Neches River	CE	FWD	Jul 51	Aug 82 R	Feb 63 OCE AR
Sam Rayburn	Angelina River	CE	FWD	Jan 73 R	May 81 R	Feb 73 SWD AR
<u>Trinity Riv Master</u>		CE	FWD	May 75 P		May 75 SWD
Benbrook	Clear Fork	CE	FWD	May 75 P	Jun 82	May 75 SWD
Lakeview	Mountain Creek	CE	FWD			
Aubrey	Elm Fork	CE	FWD			
Lewisville	Elm Fork	CE	FWD	May 75 P		May 75 SWD

STATUS OF WATER CONTROL MANUALS IN SWD

RESERVOIR	STREAM	OWNER	DIST	WATER CONTROL MANUAL SUBMITTED	SCHEDULED THRU FY 83	APPROVED
Grapevine	Denton Creek	CE	FWD	May 75 P		May 75 SWD
Lavon	East Fork	CE	FWD	May 75 P		May 75 SWD
Navarro Mills	Richland Creek	CE	FWD	May 63		Jul 64 OCE AR
Bardwell	Waxahachie Creek	CE	FWD	Aug 63		Jul 65 OCE AR
Wallisville	Trinity River	CE	GD	(Work on project stopped)		
Buffalo Bayou Master		CE	GD			
Barker	Buffalo Bayou	CE	GD	May 63 F	Dec 81 R	Oct 72 SWD R
Addicks	Buffalo Bayou	CE	GD	May 63 F	Dec 81 R	Oct 72 SWD R
Brazos Riv Master		CE	FWD	Jan 73		Mar 73 SWD R*
Whitney	Brazos River	CE	FWD	Jan 74 F	May 83 R	Apr 75 SWD
Aquilla	Aquilla Creek	CE	FWD		Oct 82	
Proctor	Leon River	CE	FWD	Feb 74 F		Apr 74 SWD
Belton	Leon River	CE	FWD	Apr 76 F		May 76 SWD
Stillhouse Hollow	Lampasas River	CE	FWD	May 76 F		Jul 76 SWD
North Fork	N. F. San Gabriel	CE	FWD	Dec 79 P	Feb 82	Jun 80 SWD R
Granger	San Gabriel	CE	FWD	Jan 80 P		Sep 80 SWD R
Waco	Bosque River	CE	FWD	Jul 73 F		Aug 73 SWD
Somerville	Yegua Creek	CE	FWD	Oct 73 F		Nov 73 SWD
Colorado Riv Master		CE	FWD			
Hords Creek	Hords Creek	CE	FWD	Sep 55	Jun 83 R	May 62 OCE AR
O. C. Fisher	N. Concho	CE	FWD	Jan 56	Oct 81 R	Dec 62 OCE AR
Twin Buttes (1)	S. Concho	WPRS	FWD	Jan 66 P	Feb 81	Sep 66 FR
Marshall Ford (1)	Colorado River	WPRS	FWD	Dec 79	1981	May 80 SWD R
Guadalupe Riv Master		CE	FWD	Oct 63		Jan 66 OCE AR
Canyon	Guadalupe River	CE	FWD	Mar 73		May 73 SWD
Rio Grande Master		CE	AD	Aug 66 F		Feb 67 OCE
Abiquiu	Rio Chama	CE	AD	Feb 68	Aug 81 R	Mar 69 SWD R*
Galisteo	Galisteo Creek	CE	AD	Mar 68 F		Apr 68 OCE
Cochiti	Rio Grande	CE	AD	Aug 78		Sep 80 SWD R*

STATUS OF WATER CONTROL MANUALS IN SWD

RESERVOIR	STREAM	OWNER	DIST	WATER CONTROL MANUAL SUBMITTED	SCHEDULED THRU FY 83	APPROVED
Jemez Canyon	Jemez River	CE	AD	Aug 66 F	Aug 82 U	Feb 67 OCE
Platoro (1)	Conjos River	WPRS	AD	Apr 64 F		May 64 OCE
Pecos Riv Master		CE	AD	Nov 77		Nov 77 SWD AR
Los Esteros	Pecos River	CE	AD	Dec 79	Dec 80	Apr 80 SWD R
Sumner (1)	Pecos River	WPRS	AD		Sep 81	
Two Rivers	Rio Hondo	CE	AD	Jun 62 F		Jun 64 OCE

Note:
(1) = Section 7 project, flood control regulation by CE.
AR = Approved, comments to be answered.
F = Complete, comments have been answered and approved.
FR = Published in Federal Register.
P = Plan.
R = Revision or answer to comments.
R* = Returned without approval.
U = Update of existing approved manual.
GRDA = Grand River Dam Authority.
WCID = Wichita County Water Improvement District.
LCRA = Lower Colorado River Authority.
WPRS = Water And Power Resources Service.

SECTION V - REGULATION OF MULTI-PURPOSE PROJECTS WITH HYDROPOWER

HYDROPOWER GENERATION
AT
SOUTHWESTERN DIVISION PROJECTS

The 17 hydropower projects are listed in the following table. Generation by the projects, since impoundment, is shown on the graphs following the table in the order listed in the table.

Project	Basin	Stream	No. Units	Total Capacity MW	Plate No.
Beaver	White	White	2	112	1
Table Rock	White	White	4	200	2
Bull Shoals	White	White	8	340	3
Norfork	White	North Fork	2	70	4
Greers Ferry	White	Little Red	2	96	5
Keystone	Arkansas	Arkansas	2	70	6
Ft. Gibson	Arkansas	Grand	4	45	7
Webbers Falls	Arkansas	Arkansas	3	60	8
Tenkiller Ferry	Arkansas	Illinois	2	34	9
Eufaula	Arkansas	S. Canadian	3	90	10
R.S. Kerr	Arkansas	Arkansas	4	110	11
Ozark-Jeta Taylor	Arkansas	Arkansas	5	100	12
Dardanelle	Arkansas	Arkansas	4	124	13
Denison	Red	Red	2	70	14
Broken Bow	Red	Mountain Fork	2	100	15
Sam Rayburn	Neches	Angelina	2	52	16
Whitney	Brazos	Brazos	2	30	17

BEAVER

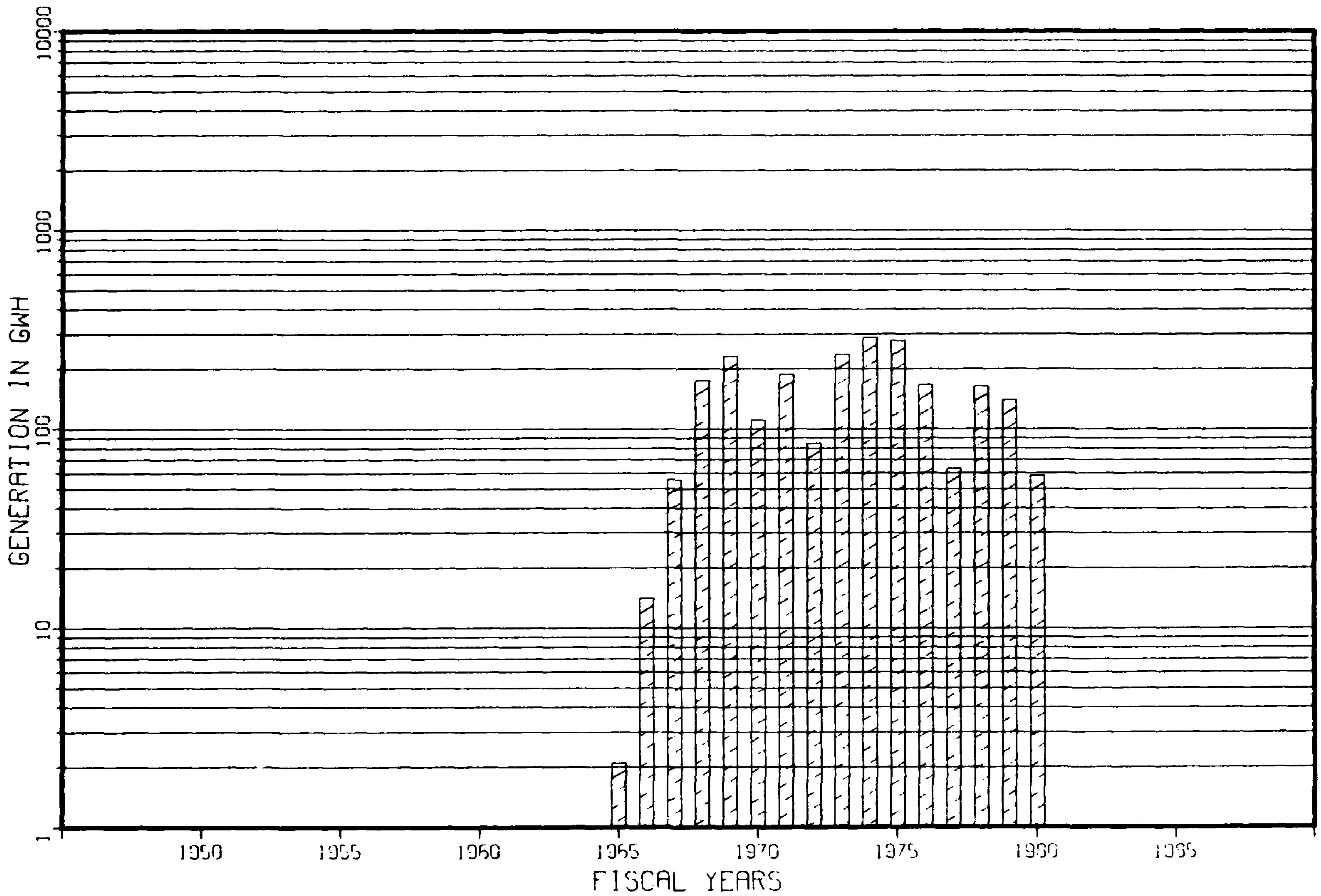


PLATE 1

TABLE ROCK

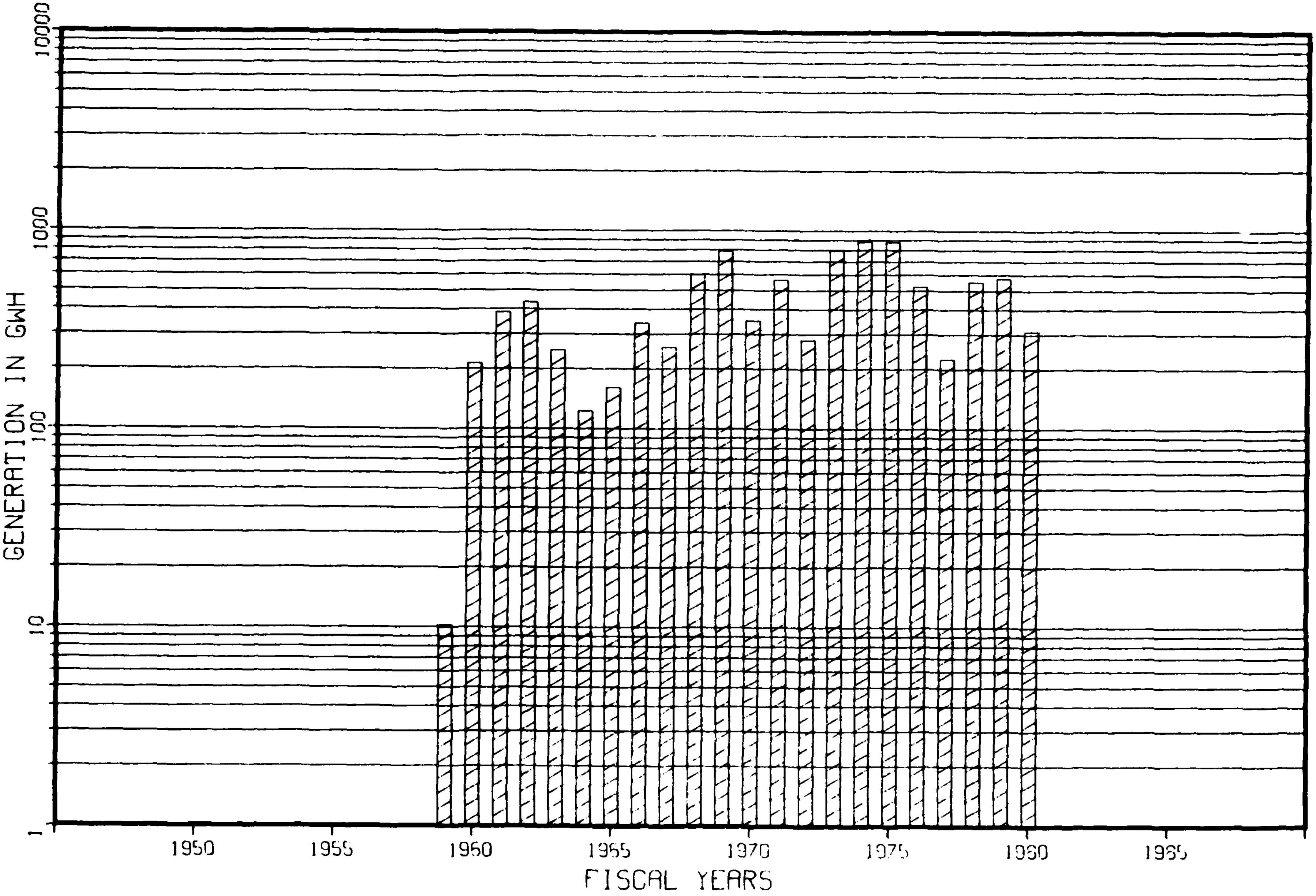
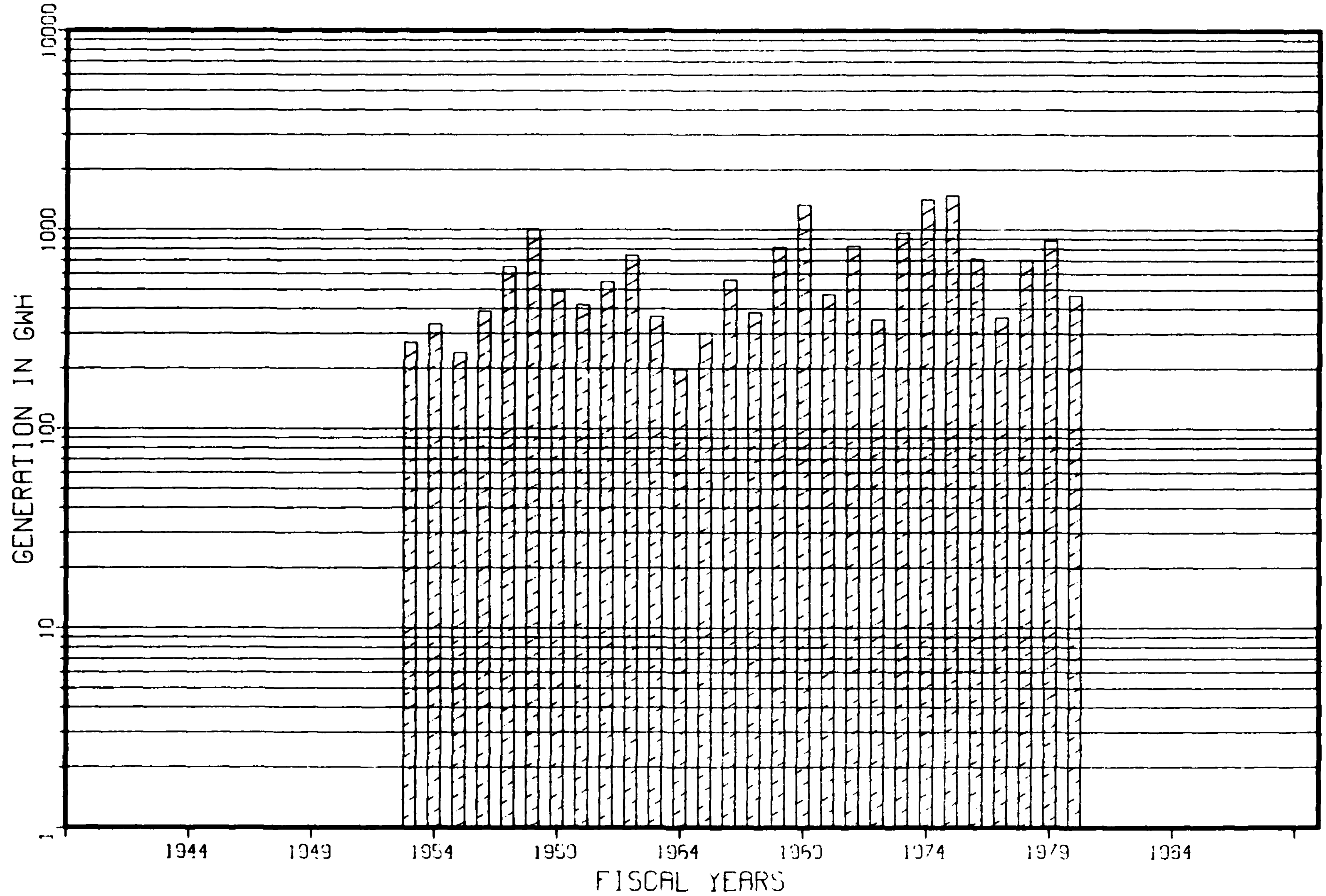


PLATE 2

BULL SHOALS



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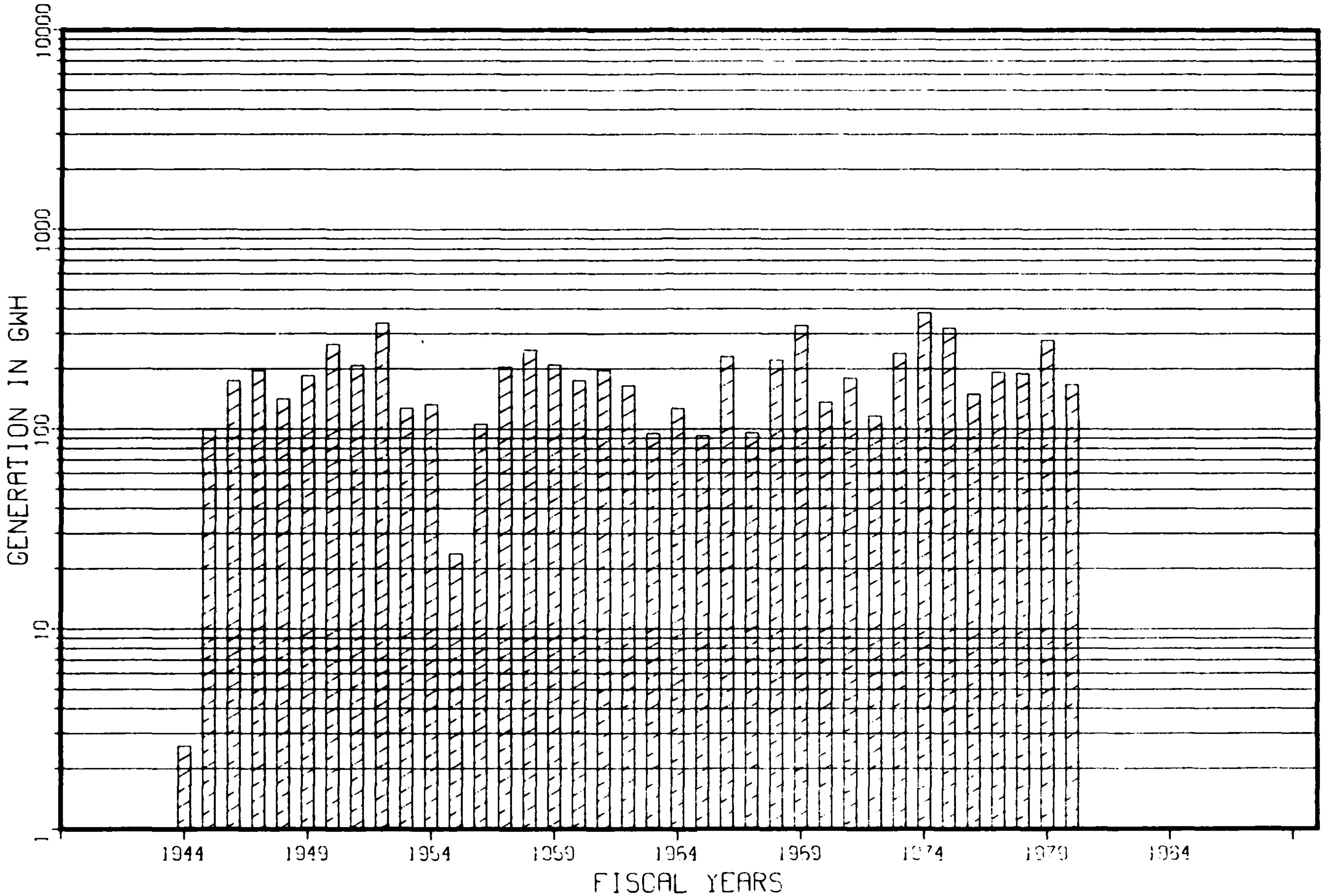
NORFORK



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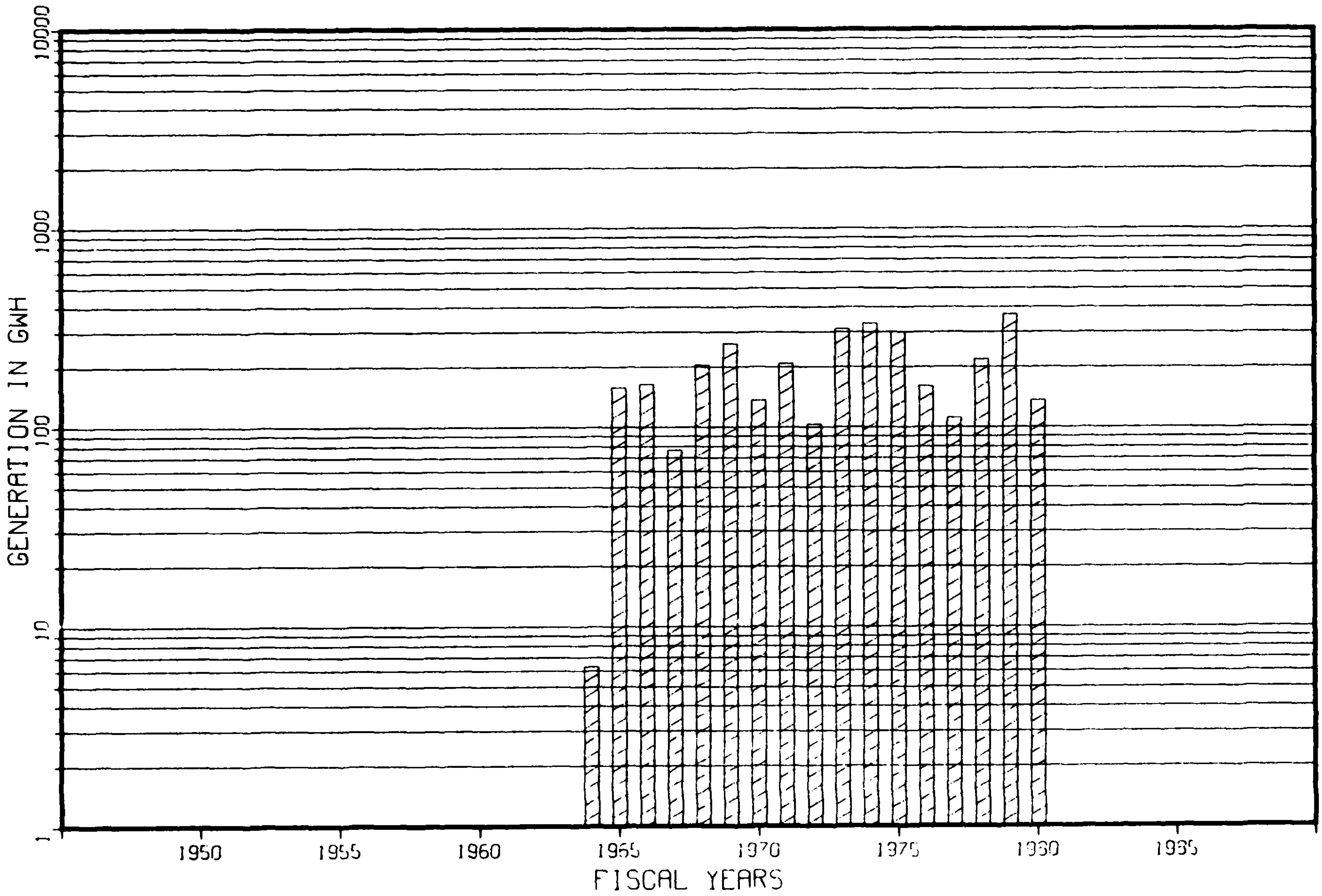
GREERS FERRY



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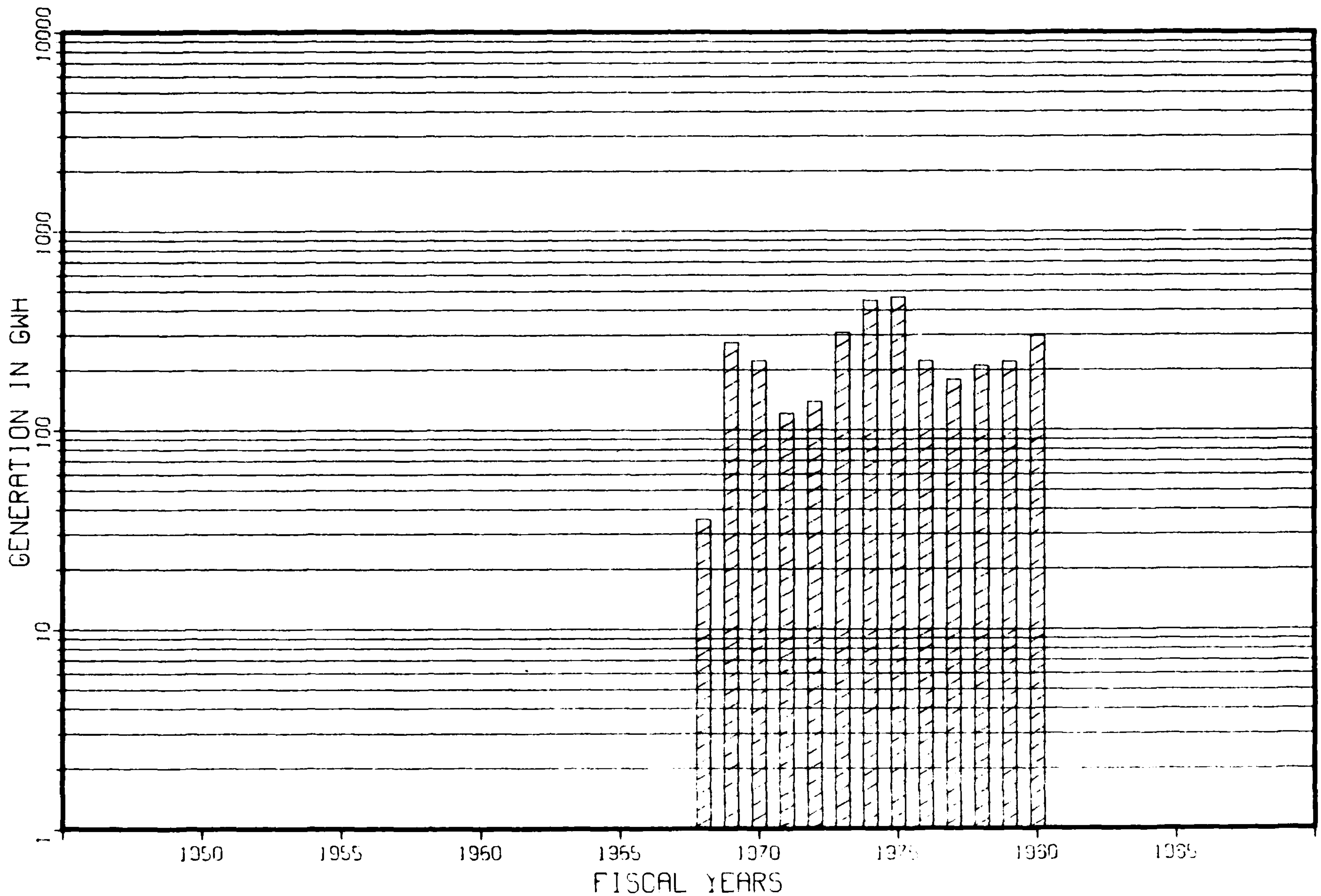
KEYSTONE



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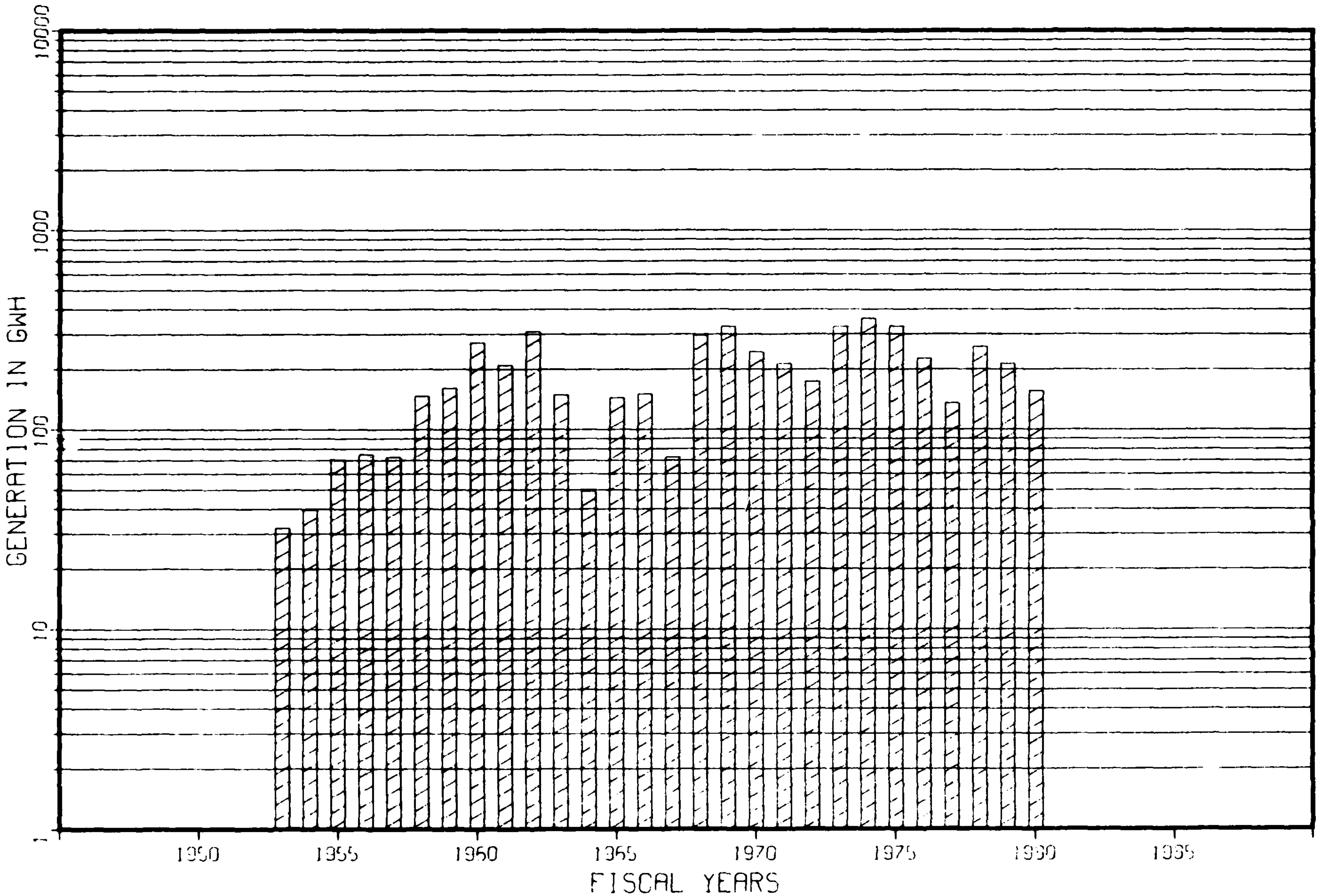
FT GIBSON



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WEBBERS FALLS

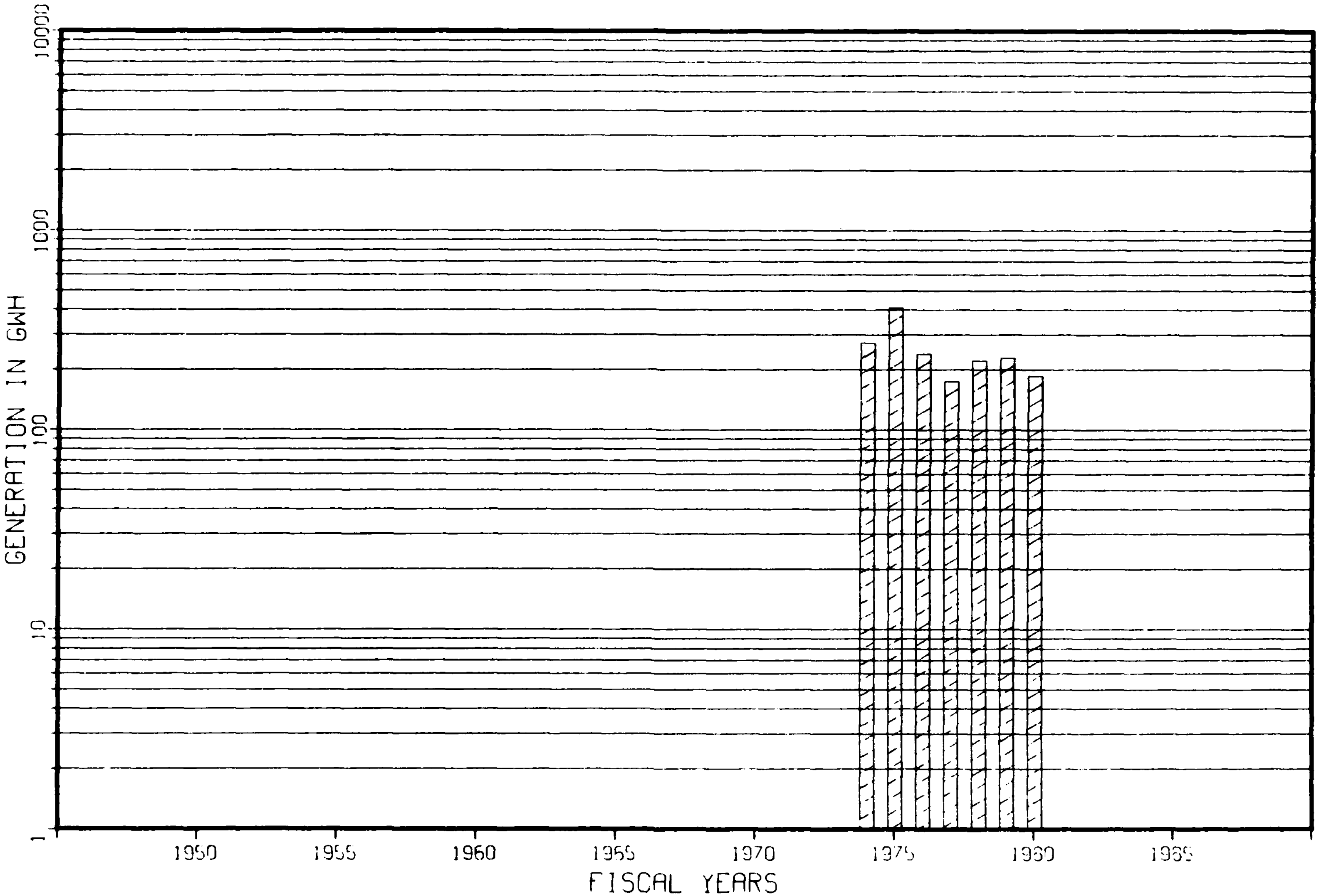
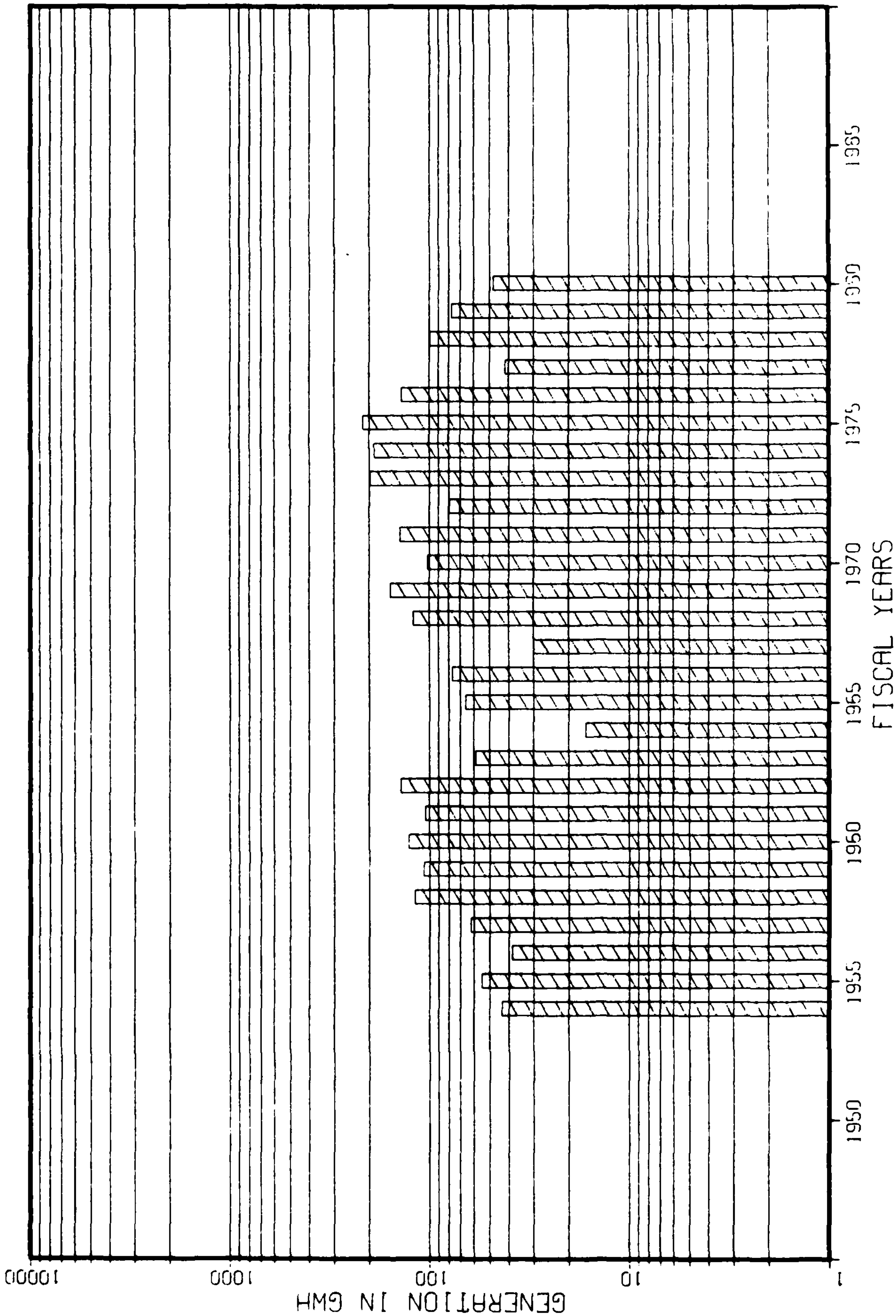


PLATE 8

TENKILLER FERRY



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EUFAULA

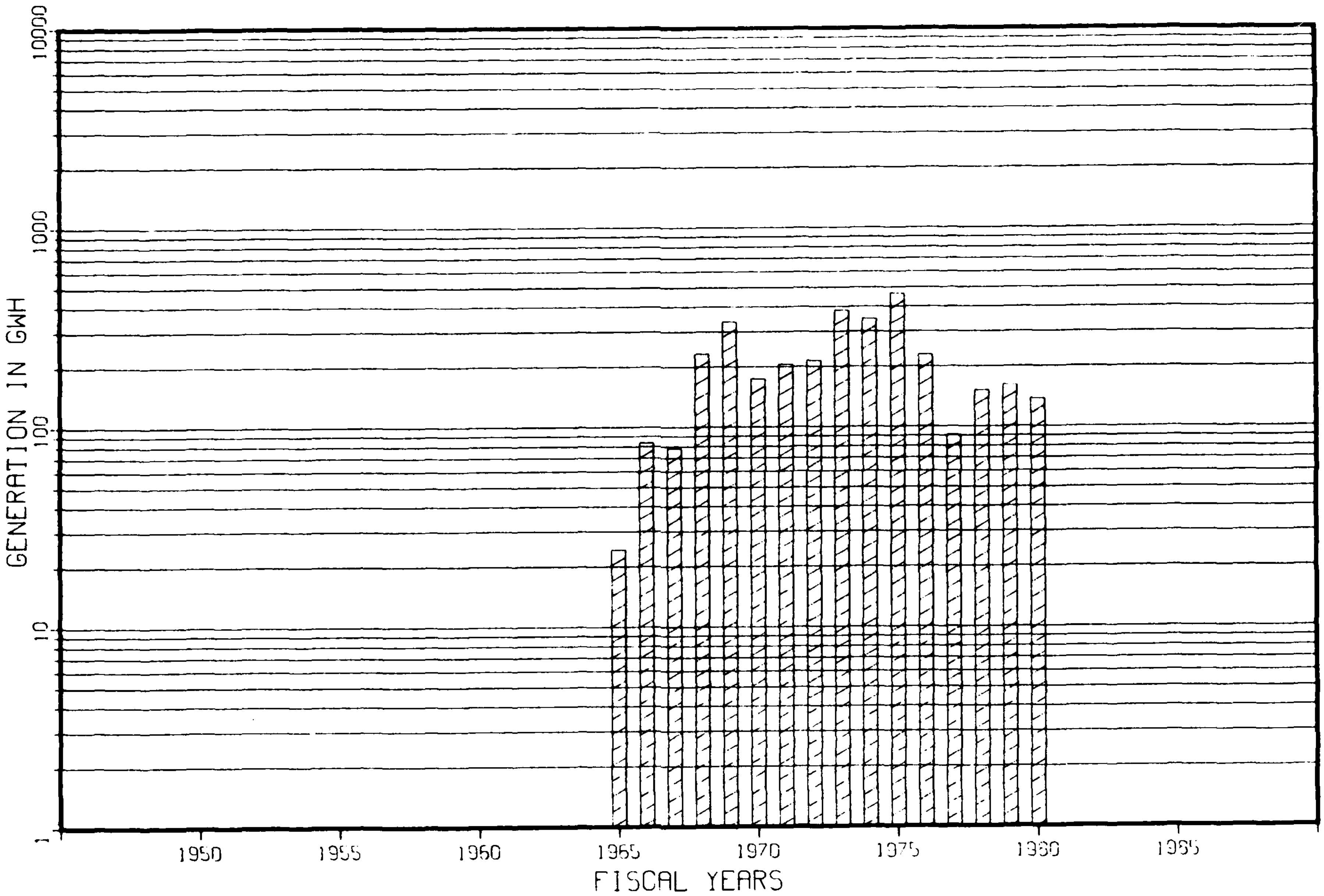


PLATE 10

R S KERR

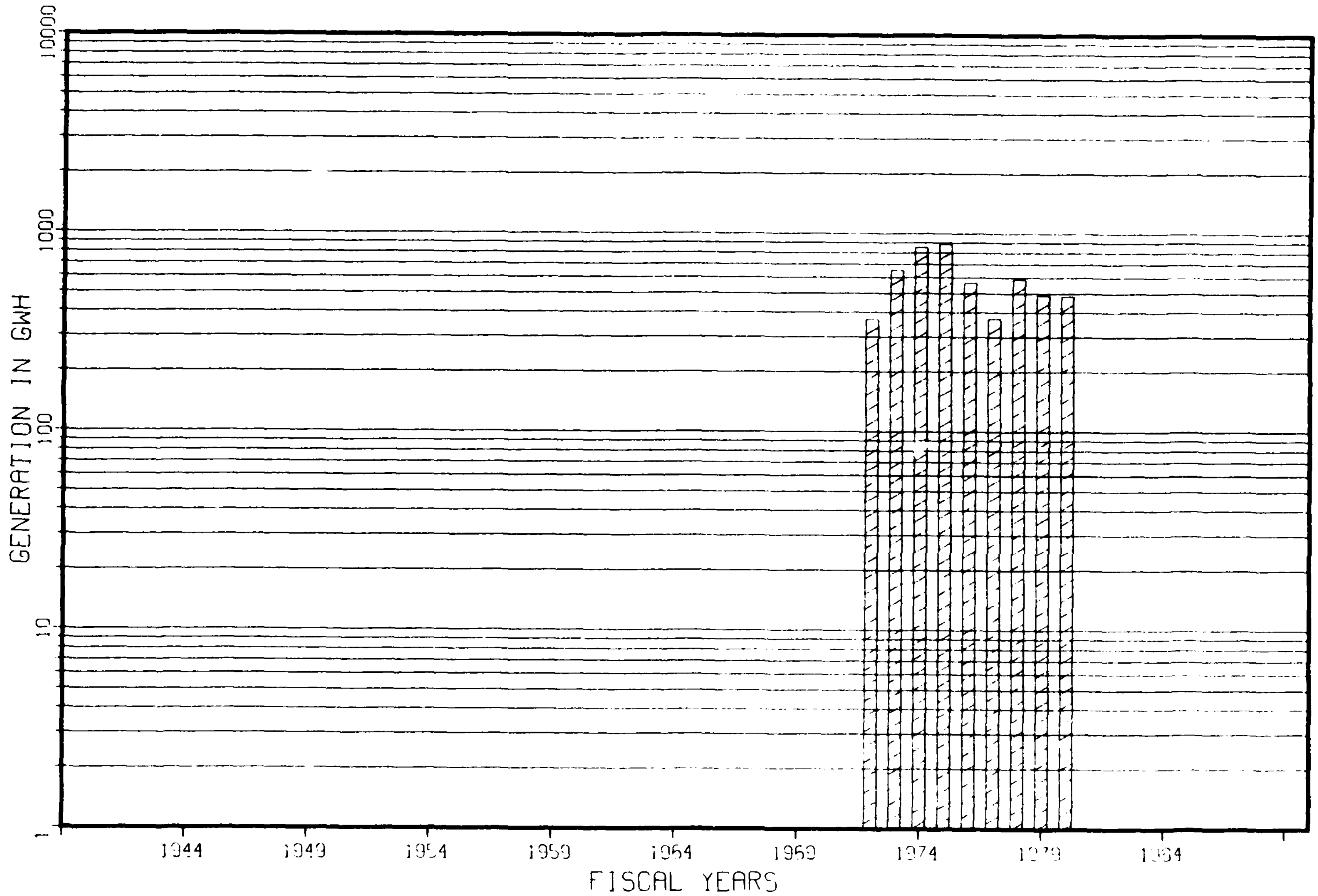
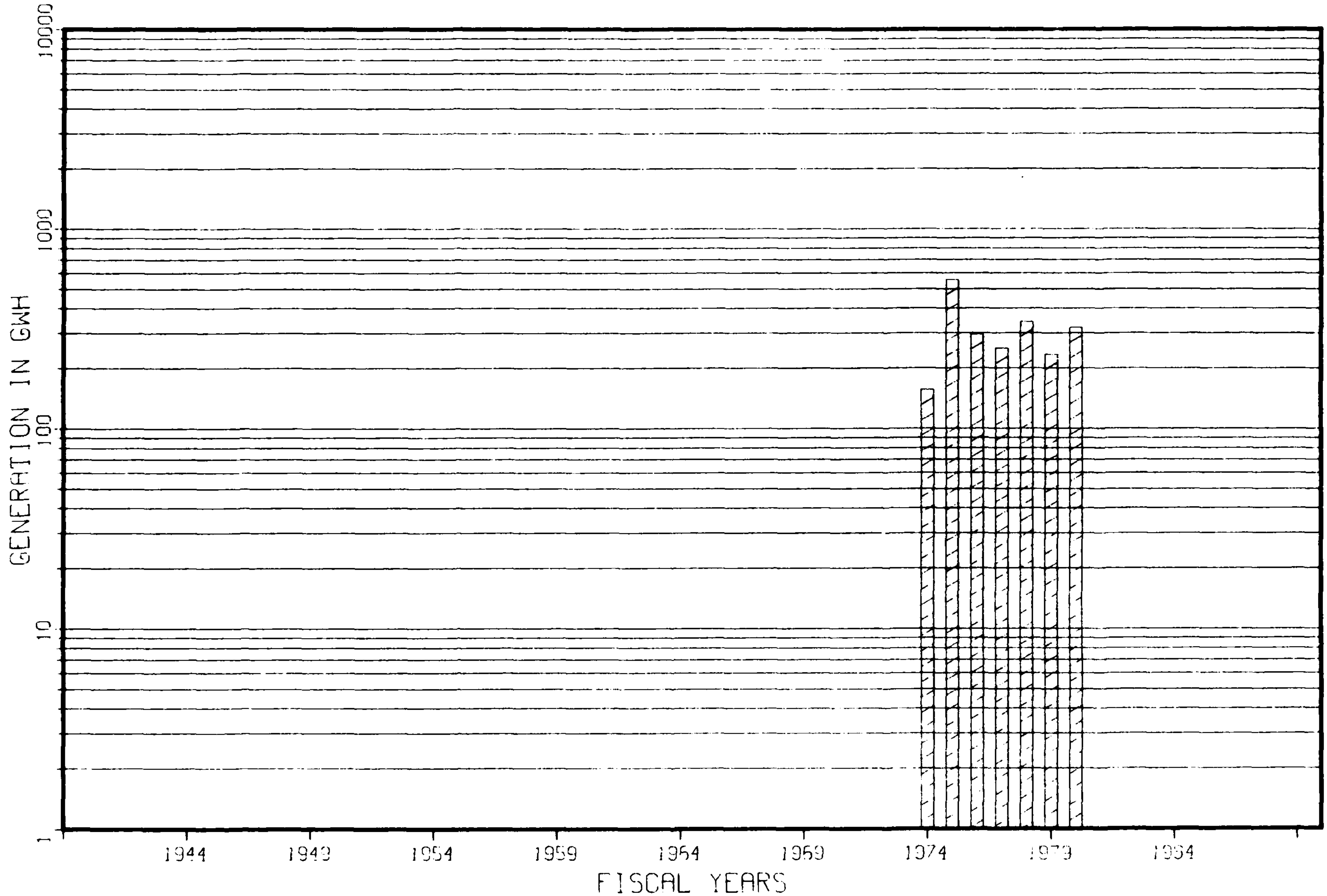


PLATE 11

OZARK



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DARDANELLE

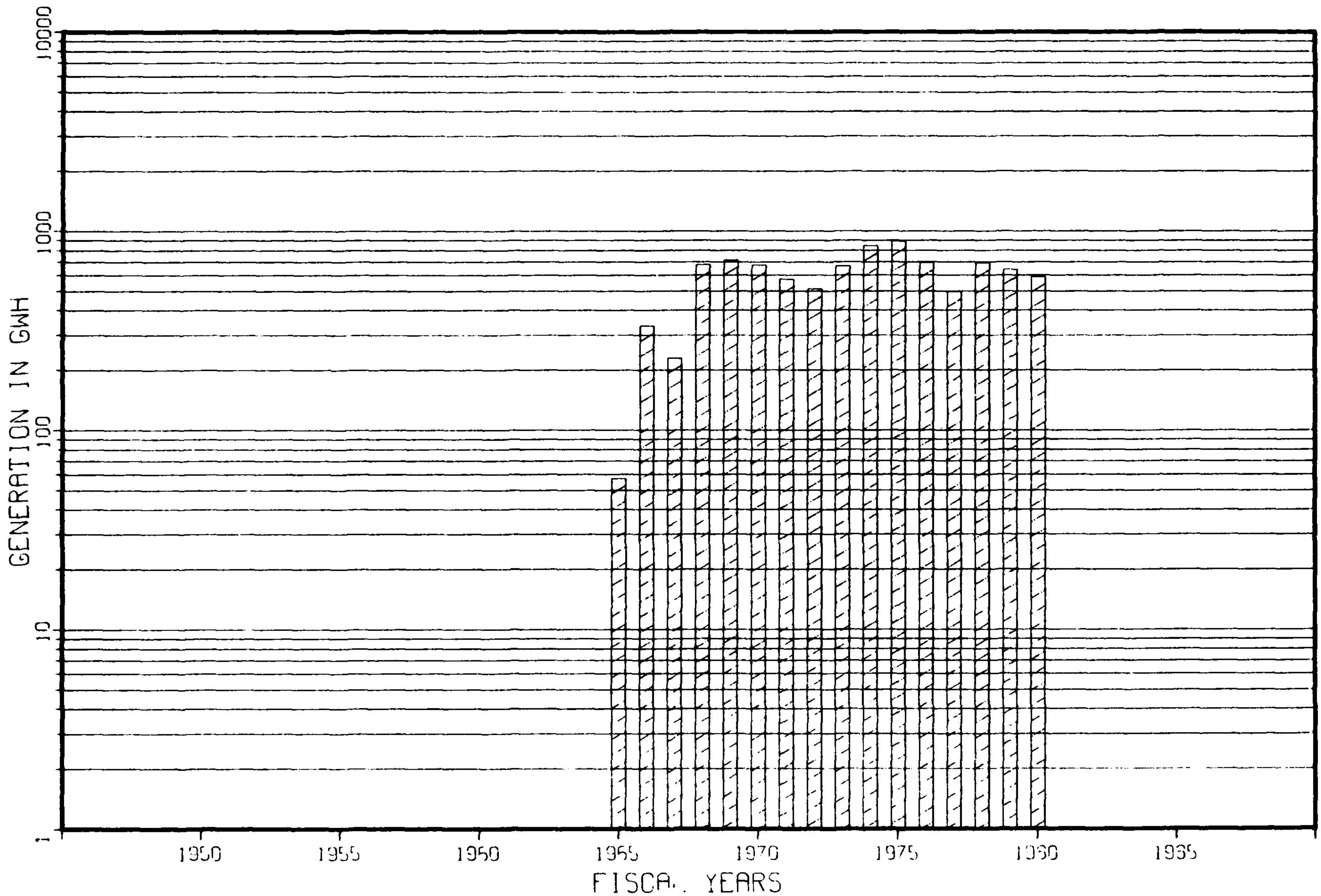


PLATE 13

DENISON

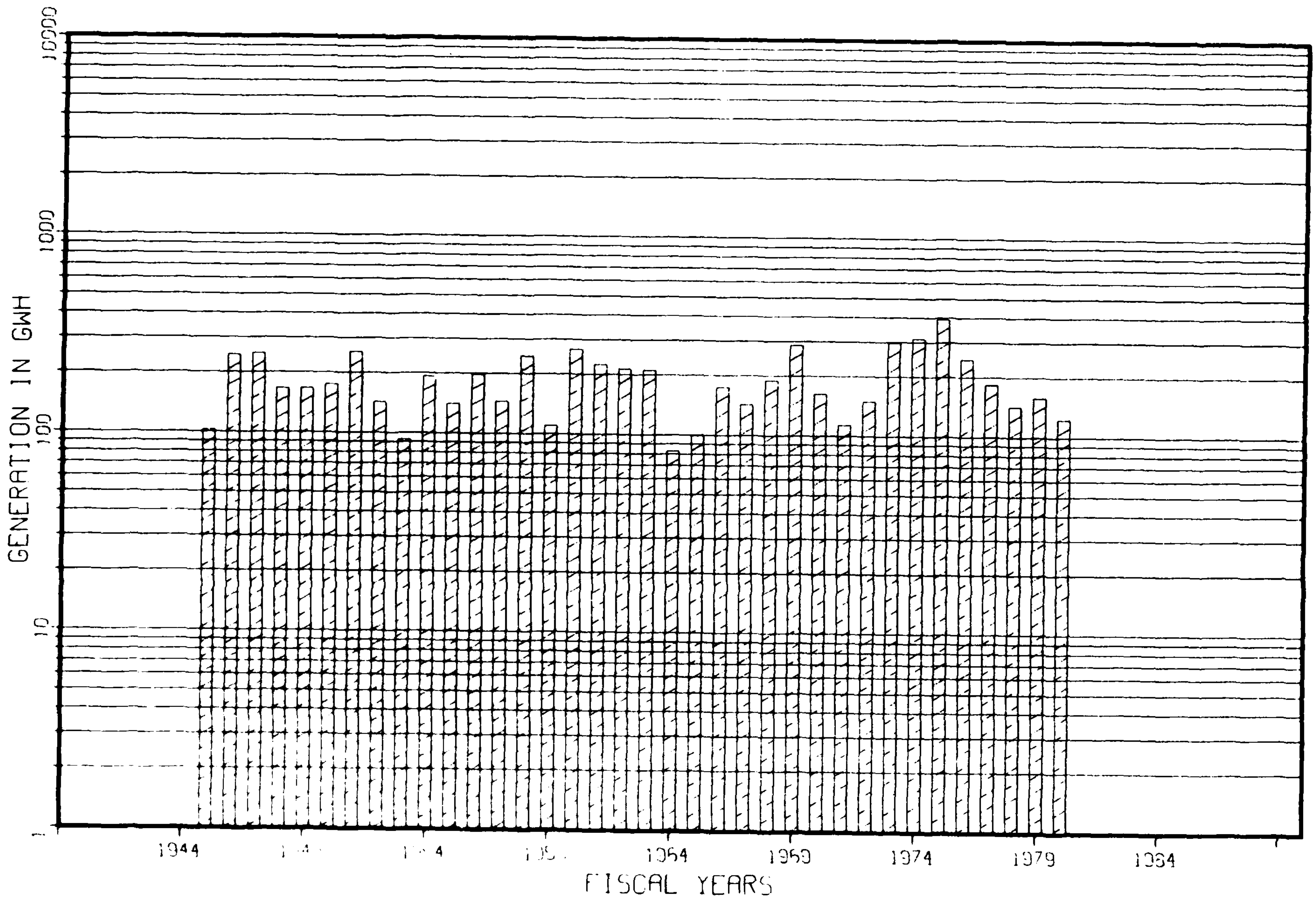
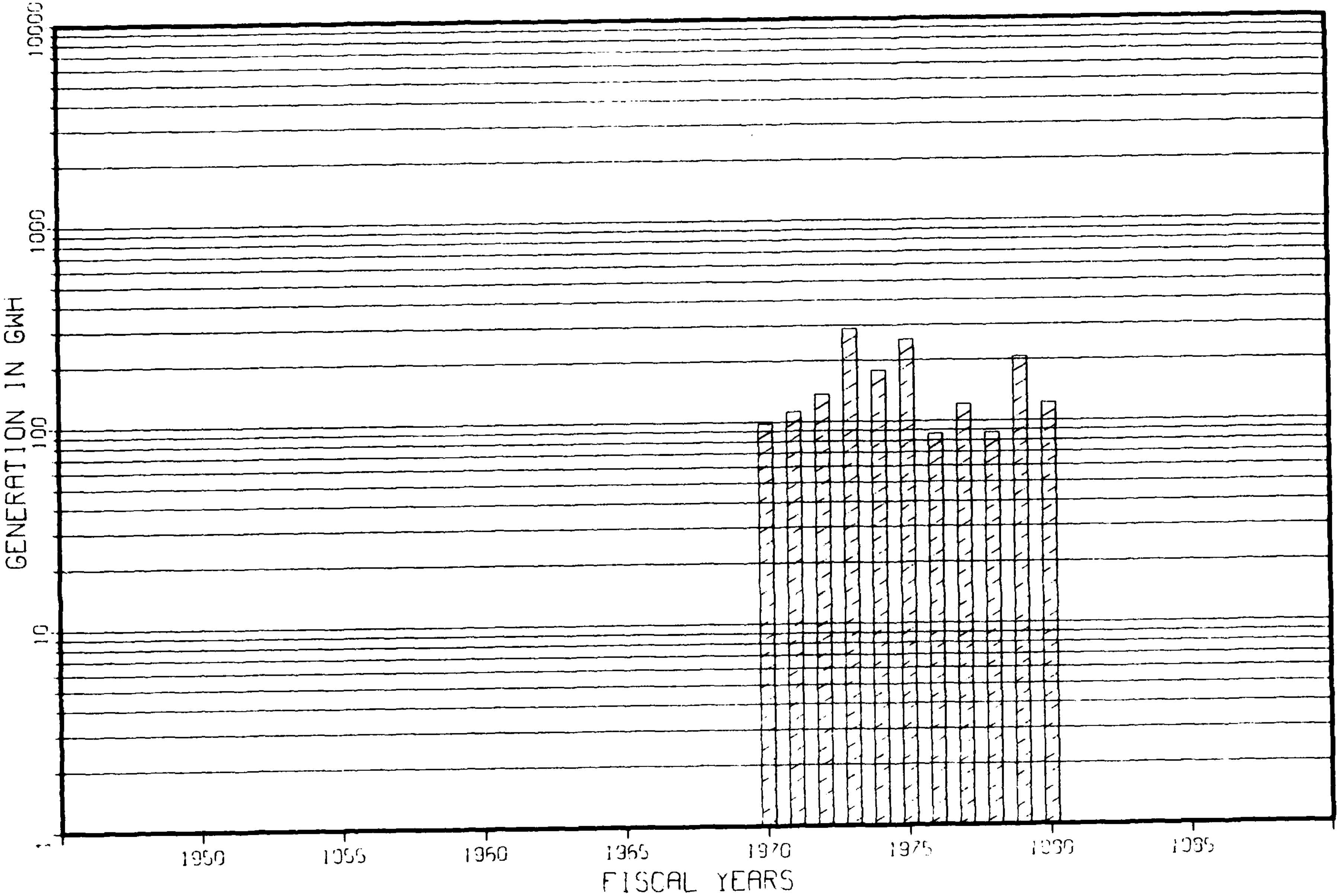


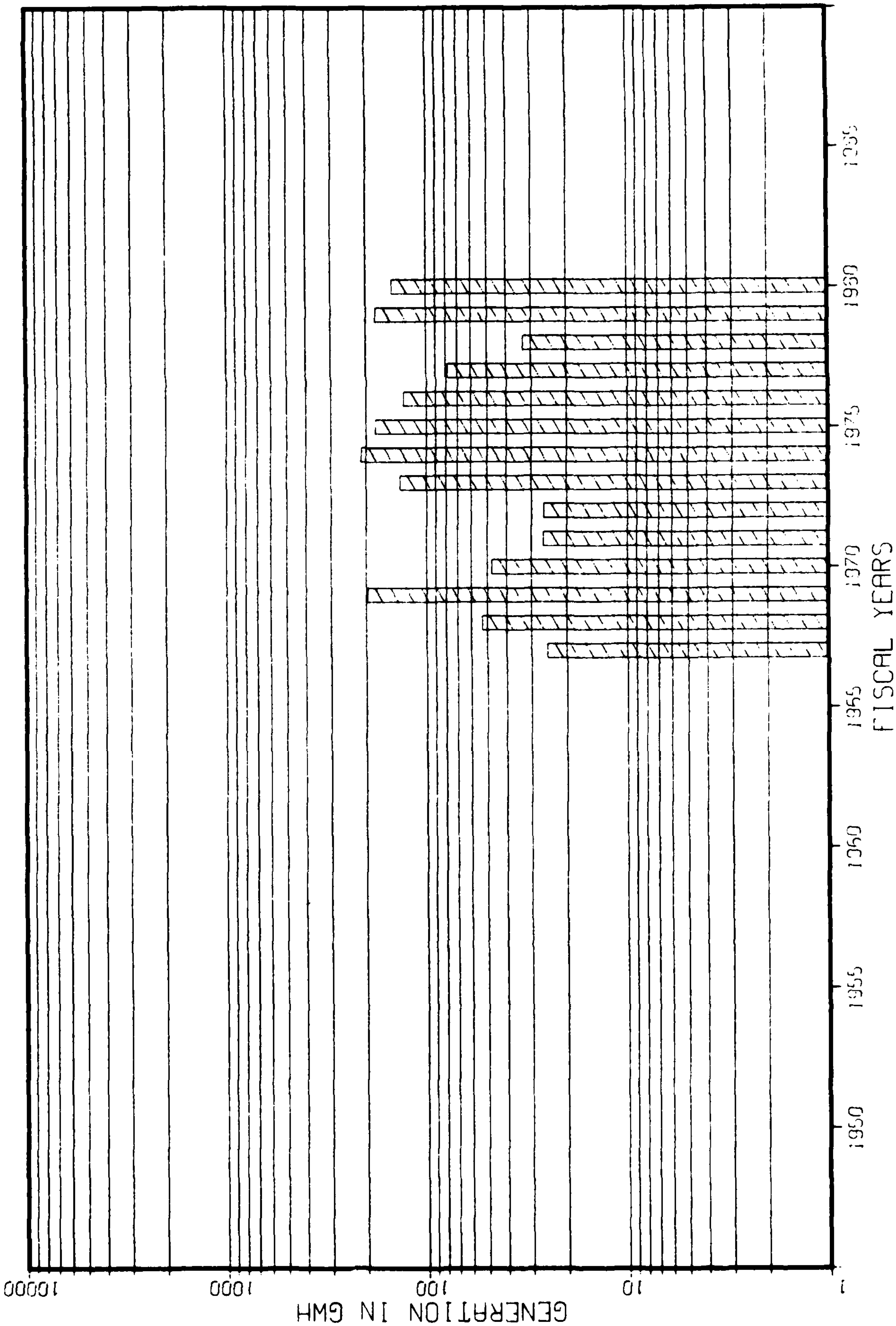
PLATE 14

BROKEN BOW



10000
1000
100
10
GENERATION IN GWH
1950
1955
1960
1965
1970
1975
1980
1985
FISCAL YEARS

SAM RAYBURN



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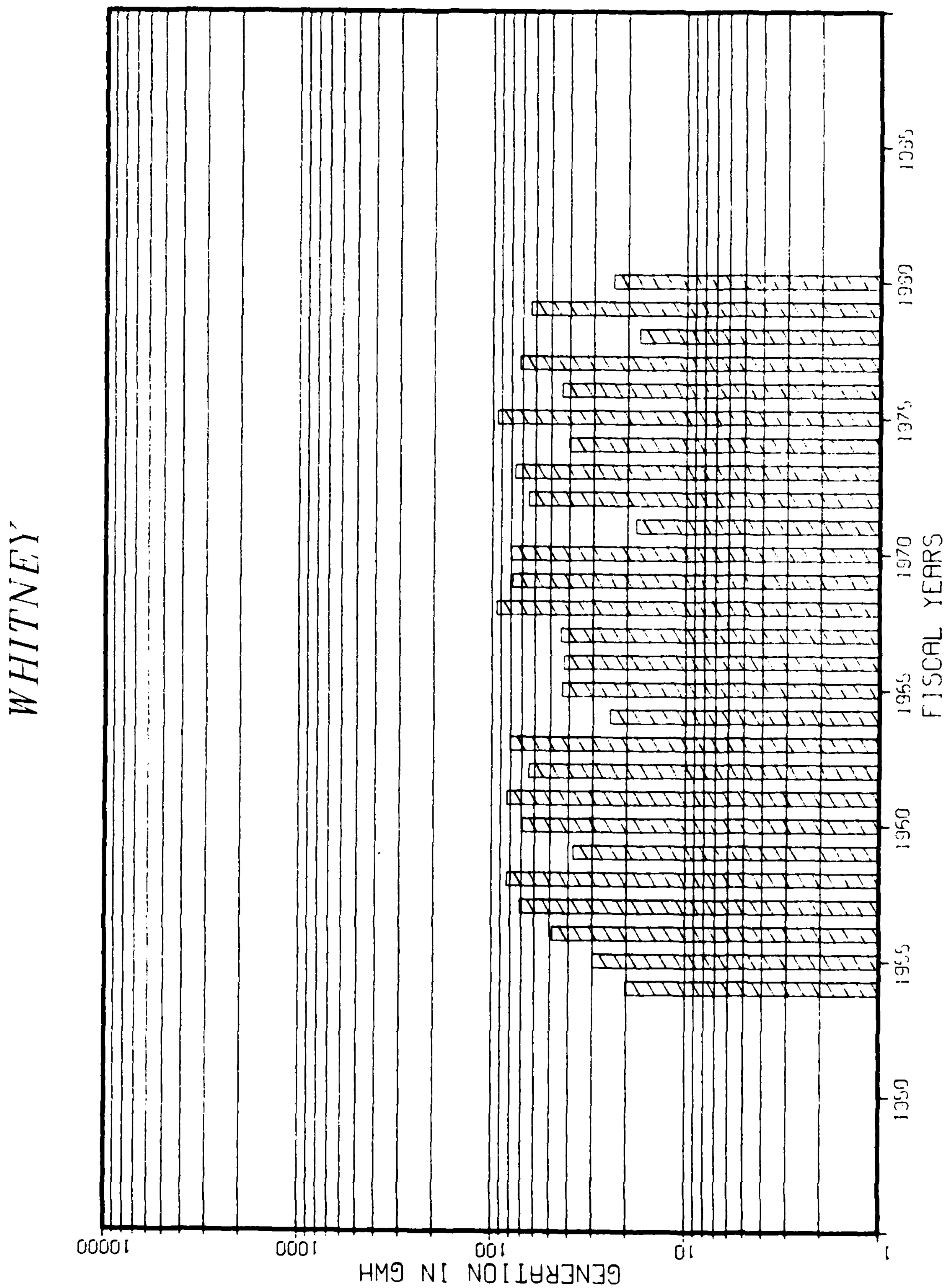

WHITNEY
FISCAL YEARS
1950
1955
1960
1965
1970
1975
1980
1985
GENERATION IN GWH
1
10
100
1000
10000

PLATE 17

SECTION VI - DISTRICT WATER CONTROL ACTIVITIES

SECTION VI - DISTRICT WATER CONTROL ACTIVITIES

1. SPECIAL RESERVOIR OPERATION.

a. Albuquerque District.

(1) The snowpack in the Rio Grande Basin during 1980 was much above normal and exceeded the 1979 snowpack in the upper Chama Basin. During the spring months of April and May the runoff was greatly reduced. Spring runoff in 1980 was about 75 percent of the 1979 runoff. Table 1 lists forecasted and observed flows for the runoff period.

TABLE 1

1980 Snowmelt Runoff

Location	Runoff in 100 Acre-Feet	
	Apr. 1 Forecast*	Observed
Rio Grande nr Del Norte	700 (Apr-Sep)	643 (Apr-Jul)
Rio Grande at Otowi	1340 (Mar-Jul)	1142 (Apr-Jul)
Conejos River nr Mogote	340 (Apr-Sep)	264 (Apr-Jul)
Rio Chana at El Vado	490 (Mar-Jul)	399 (Apr-Jul)
Rio Chama nr Chamita	635 (Mar-Jul)	538 (Apr-Jul)

* Coordinated NWS and SCS Forecast.

(2) Runoff in the Arkansas Basin was much above average. Purgatoire River water users stored in excess of their 20,000 acre-feet of water rights. This water was retained at the project and exchanged with other water purchased within the basin. Water was carried over in John Martin through the summer for the first time since 1965. The three countjes adjacent to John Martin purchased transmountain water to establish a 10,000 acre-foot recreation pool.

b. Fort Worth District. During 1980, the escalation of a mild winter drought into a severe summer drought with record setting high temperatures prompted the Small Business Administration to declare more of the State of Texas a disaster area. Two Drought Situation Reports were forwarded prior to the reduction in the drought severity in September 1980. Most of the reservoirs in the District were affected by the drought, two of wich required special operations. Those plus other operations are listed below.

(1) After public hearings on the flood control operation of Lake O' The Pines, it was requested that a deviation from the New Orleans District plan be approved as an interim until a new method could be studied by the Fort Worth District. The New Orleans District plan required that flood releases be initiated any time there was water stored in the flood control pool, without regard for downstream flooding. The deviation, which was approved, required that downstream conditions be considered, and no releases would be made while

uncontrolled flows below the dam were above damaging stages. An additional stipulation was added, by SWD, that required a return to the New Orleans District plan while water is stored above fifty percent of the flood control pool. Preliminary studies have prompted a request to continue the deviation, with the exception that a return to the New Orleans District plan be made at the fee acquisition elevation of 236.0 feet, n.g.v.d., instead of the fifty percent flood pool elevation of 240.7 feet, n.g.v.d. A new water control plan will be presented with the submittal of the Water Control Manual.

(2) The Hydrologic Engineering Center developed a model to evaluate the combined operation of Sam Rayburn Reservoir and B. A. Steinhagen Lake for hydropower, water supply, and salt water intrusion. The results of the evaluation was presented to the Lower Neches Valley Authority (LNVA), contractor for the water supply, and the Southwestern Power Administration at a meeting in April 1980. It was agreed that the plan presented would be implemented on an interim basis until additional refinements and requirements can be analyzed. Another meeting will be held prior to the 1981 Spring operations to discuss the performance of the interim plan and present the additional studies. Those studies are to be completed by mid-January 1981.

(3) A directive was received from the State of Texas to release water from the unused navigation storage of Benbrook Lake for the City of Fort Worth. The time period was for 30 days from mid-September through mid-October 1980. The water was to off-set that being supplied to keep Lake Arlington, a local water supply lake, up to an elevation that is usable by the Texas Electric Service Company at their steam generation plant.

(4) Hydropower at Whitney Lake was curtailed from February through May due to low lake levels as a result of the drought. The generation for the contractor was made up from Lake Texoma in the Tulsa District.

(5) Deliberate impoundment began at two new projects during the year, Granger Lake on 21 January 1980 and North Fork Lake on 3 March 1980.

(6) The field portion of the Emergency Water Data Transmitter (EWDT) Study was installed on the Guadalupe River above Canyon Lake in March 1980. The equipment installed was a Handar data collection platform (dcp) with an emergency transmission channel. The dcp transmits normally on a three hour basis and during high flows immediately upon exceeding a river stage of 15 feet. The dcp has transmitted emergency data on only one occasion since installation. The district office portion of the EWDT has still not been completed due to difficulties of the LaBarge interrogatable platform locking on to the satellite. LaBarge is working with this office to alleviate those problems. The OCE funded project when completed, will function as follows: a.) The field sight dcp will transmit emergency river data to a receive sight at Wallops Island via COES satellite; b.) the computer at Wallops will recognize the emergency and send out an interrogation to the platform in the district office.; c.) when an interrogation is received the platform will switch on an HP 9830; d.) the HP 9830 will call one of the Lake Control Unit (LCU) personnel at home; and e.) the HP 9830 will then call the National Environmental Satellite Services (NESS) computer to receive the emergency data that has been transmitted. The data will be waiting in the office for the LCU personnel who was called.

c. Galveston District.

(1) Barker Reservoir. The only special reservoir operation conducted at Barker Reservoir during the year was gate changes to provide for routine maintenance to gate motors and painting. Releveling of the reservoir area, necessitated by land-surface subsidence, was performed in FY 76 using the 1973 adjustment to the 1929 NGS Sea Level Datum. Revised area-capacity data and adjusted reference elevations will be utilized for reservoir operation beginning in FY 81.

(2) Addicks Reservoir. The only special reservoir operation conducted at Addicks Reservoir during the year was gate changes to provide for routine maintenance to gate motors and painting. Releveling of the reservoir area, necessitated by land-surface subsidence, was performed in FY76 using the 1973 adjustment to the 1929 NGS Sea Level Datum. Revised area-capacity data and adjusted reference elevations will be utilized for reservoir operation beginning in FY 81.

d. Little Rock District. The Little Rock District boundary was changed 1 October 1980 to include the Tulsa District portion of the State of Arkansas.

(1) Water year 1980 produced drought-like conditions throughout the Little Rock District. River basins within the district experienced accumulated rainfalls of 10-20 inches below normal with project inflows of 30 to 75 percent of their average yearly volumes. Consequently, district lake levels have remained at or below conservation elevations throughout the year except for three or four minor rises into the flood pools of the three smaller flood control lakes (Clearwater, Nimrod, and Blue Mountain).

(2) To date the drought conditions have not created any major problems with respect to meeting the project purposes at any of the district lakes. However, the Southwestern Power Administration is utilizing some banking and purchasing arrangements to lessen lake drawndowns for hydropower production in the White River System. The drought conditions along the Mississippi River Basin have created intermittent, navigation depth problems along the White River entrance channel to the McClellan-Kerr Navigation System. By use of dredging and tow size restrictions, the entrance to the system has remained open to navigation.

(3) Special operations at specific projects for water year 1980 are summarized in the following subparagraphs.

(a) In anticipation of the low D.O. conditions that develop in Table Rock Lake each fall, the lake level was lowered to elevation 910 by priority hydropower loading. The lower pool level decreases the possibility of pool stages rising into the flood pool during the low D.O. season when generation rates are curtailed to avoid adverse impact from low D.O. releases. To lessen the impact of reduced pool levels and restricted generation rates at Table Rock, the higher seasonal pool level, elevation 657, at Bull Shoals Lake was extended through 30 September 1980. Curtailment of peak generation rates at Table Rock Lake were begun 8 September 1980 and continued into water year 81 because of low dissolved oxygen concentrations in the power releases. However, Bull Shoals Lake levels did not rise to the seasonal pool level

because of the low flow conditions experienced during the deviation period.

(b) After initiation of the above deviation and in light of pool drawdowns occurring as a result of normal power needs during the drought conditions, SWPA was requested to continue priority loading at Table Rock to draw the pool below spillway crest elevation 896 so the spillway tainter gates could be painted. However, the pool level has not reached the spillway crest and only that portion of the gates above the water surface has been painted.

(c) Greers Ferry. The seasonal pool operation was begun on 21 April 1980, in lieu of the normal 1 May starting date, to avoid dumping water during drought conditions under supplemental sells as would be required with normal Zone II pool criteria.

(d) Clearwater Lake. The annual seasonal pool drawndown at Clearwater Lake was delayed for 30 days to provide continued low flows needed by the Arkansas Game and Fish Commission (AGFC) to complete construction work in low-lying areas of their wildlife refuge near Corning, Arkansas. The pool was held near elevation 496.5 from 15 September until 15 October. The construction work was completed on 15 October and the pool was lowered to conservation pool elevation 494.0 on 21 October. Releases during the drawdown were timed to provide water needed for the seasonal filling of the AGFC wildlife refuge.

(e) Nimrod Lake. The lake was lowered in September 1979 for work on the Plainview, Arkansas, water supply intake structure. The work was completed 1 October 1979 and refilling operations were begun. Due to lack of rain, the pool stayed below the conservation pool until 23 December 1979. Thereafter, the lake was at conservation pool elevation 342.0 except for four minor rises.

(f) To provide water for sustained releases near regulating stages on the Petie Jean River for water surface profile surveys, Blue Mountain Lake inflows were stored between 23 March and 1 May 1980. During this operation, the pool reached elevation 390.0, 6 feet above the conservation pool, prior to beginning releases with a target for sustained stage of 14 feet on the Danville gage. The sustained stages allowed Little Rock District personnel time to stake the resultant water surface profile and inspect the downstream valley under conditions which generate flood complaints. The project was returned to the normal regulation criteria on 1 May 1980. A study of current and alternative regulation procedures for this project is currently underway.

(g) Arkansas River Basin. On the Arkansas River below Fort Smith, Arkansas, several of the pools were raised for short periods during the year to maintain navigation depths over isolated shoals while dredging operations were performed. Two of the pools (#2 and #5) were also raised to furnish irrigation water during the growing season. All the pools have been returned to normal levels. In April 1980 a joint effort by SWPA, Tulsa District, and Little Rock District was utilized to stop the Arkansas River flows at L & D No. 13 for 4 hours to facilitate search and recovery efforts related to a drowning in the Lock and Dam 13 stilling basin. Tulsa and Little Rock Districts cooperated on a special request from the Junior League of Fort Smith to hold the flows at Van Buren to 20,000 cfs on 10 and 11 May 1980 for annual canoe, sailboat, and bassboat races.

(h) There were approximately 10 permits issued for emergency water withdrawals from the White River and White River Lakes for irrigation of crops and pasture lands upstream from Newport, Arkansas. Cold water for the trout fisheries below Bull Shoals, Table Rock, Norfork, Greers Ferry and Beaver Lakes was released on a continuing basis during the hot summer months (May-Sep).

(4) Special Studies.

(a) White River Basin Reservoir, Missouri and Arkansas. A study is underway to determine the advisability of modifying the operation of the existing reservoir in the White River Basin to provide additional measures for flood control, regional water supply, agricultural water supply, hydroelectric power, navigation, recreation, fish and wildlife, and other related land resources. The study has strong local and congressional support. The study is scheduled for completion in April 1983. The special studies paragraph under the Water Quality Section of this report contains additional information.

(b) Hydropower Studies. During FY 80, the Little Rock District prepared and submitted the following reports on hydropower studies at Murray L & D No. 7 on the Arkansas River:

The Reconnance Report
The Stage 2 Report
Draft Survey Report

In addition, work was accomplished on the following hydropower reports for submission in early FY 81:

The Final Survey Report, Murray L & D
Stage 1 & 2 Report for L's & D's 8, 9, and 13.

(c) Flood Emergency Plans. Chapter 9 of O & M manuals and inundation maps for Reservoir Regulation Manuals were prepared based on our interpretation of the new and incomplete guidelines. Computations were completed for Greers Ferry, 80% complete on Clearwater dam, and 70% complete on Beaver and Table Rock dams.

e. Tulsa District.

(1) Arkansas River Basin. Below median inflow generally prevailed in the basin throughout most of the fiscal year. The months of November, December, April and May had some near normal and above normal inflows, and allowed most of the lakes in the basin to enter summer with full or near full conservation pools. Heavy rains late in October produced a new flood of record for inflow into Cheney Lake causing the pool to rise to elevation 1429.20 at 2 a.m. on 1 November 1979. The old record was 1429.0 in October 1973. The peak inflow was about 50,000 cfs occurring at about 3 p.m. on 30 October. Major flooding occurred in Sedgwick and Halstead on the Little Arkansas River and minor flooding occurred at Peck on the Ninnescah River. From the later part of June through September the district experienced temperatures much

above normal and very little rainfall. Temperatures averaged about 10 degrees above normal. Many new record daily temperatures were set throughout the district. Inflows into the projects averaged only about 30 percent of median inflow during this period. The low inflows plus the high demands of hydropower and water quality releases and continued high evaporation losses resulted in the lakes averaging about 72 percent full conservation storage. Most projects, except those with hydropower, ended the FY less than 3 1/2 feet below conservation pool level. Toronto had only 10 percent and Fall River 40 percent of their conservation storage remaining at the end of the FY. The Kansas Water Resources Board requested the reduction of the water quality releases from Toronto, Fall River and Elk City Lakes on the Verdigris River in an attempt to prolong releases. These releases were reduced a second time and a field investigation indicated these reduced flows were adequate. Special releases were made at Keystone Dam, and at the Robert S. Kerr and W.D. Mayo Locks and Dams in September to provide flow for raft races at Tulsa and Ft. Smith. Two projects were diverted in the Arkansas River basin this FY. The river at El Dorado was diverted at 1 p.m. on 3 October 1979 and at Big Hill at 1 p.m. on 27 May 1980. The top of conservation pool at Canton Lake was changed form 1615.2 to 1615.4 effective 1 July 1980. This was done to insure the necessary water for a water supply contract with Oklahoma City. On 26 June 1980, all three power units at Webbers Falls Lock and Dam were taken out of service for an indefinite time due to cracked shafts. Three tapers were run this FY for the navigation system. The first was from 21 November 1979 through 17 December 1979 with a maximum flow at Van Buren of 62,000 DSF on 27 November 1979. The second was from 30 March 1980 through 13 June 1980 with the maximum flow at Van Buren being 70,900 DSF on 3 May 1980. These releases were reduced in mid-April at Oologah, Hulah, Fort Gibson and R.S. Kerr to aid in the search for two bodies that went through the Lock and Dam 13 spillway. The third taper operation was 18 June 1980 through 11 July 1980 with Van Buren's maximum flow of 81,300 DSF occurring on 20 June 1980.

(2) <u>Red River Basin</u>. Flows in the Red River basin were below median for the fiscal year. There were, however, several months which had above median flows. These months were December, May, June and September. The spring rains allowed the projects to enter the summer with full conservation pools. A flood on Otter Creek in the latter part of May filled the conservation pool of Mountain Park Lake on 21 May 1980 at 11:30 p.m. for the first time since the project began operation in June 1975. Flood waters utilized 60% of the flood control storage and the first flood releases were made from the project. The channel capacity of the downstream channel was determined to be 300 to 350 cfs instead of the previous estimate of 1000 cfs. Starting the later part of June, very little rain fell and the temperatures were averaging above 10 degrees above normal. Many new record daily temperatures were set throughout the basin. Inflows into the projects during July, August and the first half of September averaged less than 10 percent of median. A release of 10 cfs from Waurika Lake was initiated on 1 August and made until 30 September 1980 at the request of the Oklahoma Water Resources Board. This was the first release made from Waurika Lake and was made in coordination with the conservation district as an experimental release to aid downstream farmers and cattlemen. The low flow releases at Pine Creek Lake were increased by 10 cfs from 5 August to 28 September 1980 to alleviate water quality problems at the town of Wright City. Special test releases were made from

Lake Texoma in August and early September to determine the best method of improving water quality in response to fish in distress. Heavy rains fell on the lower portion of the basin on the 27th and 28th of September. The Little River basin received ten to twelve inches of rain which resulted in most of the projects ending the fiscal year slightly above normal. Both hydropower projects in the Red River basin ended below normal with Lake Texoma down 22% and Broken Bow Lake down 29% into their conservation pools.

(3) Special releases or operations were made at Lake Texoma, Broken Bow Lake and Gillham Lake to facilitate canoe races. Also, Millwood was drawn down from elevation 259.2 to elevation 255.0. This drawdown began on 2 September 1980 and is scheduled to continue until 1 March 1981. The drawdown is requested every three years by the Arkansas Game and Fish Commission to aid in the control of aquatic vegetation and fish management. No reports of progress in solving the dam safety problems at Altus Lake and Foss Reservoir were received from the Water and Power Resources Services.

2. WATER QUALITY PROGRAM AND ACTIVITIES.

a. Albuquerque District.

(1) The goals of the Albuquerque District water quality data collection program are to provide an accurate picture of monthly lake conditions as to PH, temperatures and dissolved oxygen. Trends can be monitored to show improvement or degradation of water quality and the data can be used to identify public health, fish and wildlife problems.

(2) Data is entered into EPA STORET data base and used to monitor standard lake conditions. Monthly readings for PH, dissolved oxygen and temperature are taken downstream during water release to monitor discharge water quality.

(3) Parameters measured are surface PH, turbidity, and dissolved oxygen-temperature profiles at 1 meter intervals to the lake bottom. Data are collected monthly as follows:

PROJECT	NUMBER OF LOCATIONS SAMPLED
Abiquiu	2
Cochiti	2
Conchas	3
John Martin	3
Trinidad	3
Jemez Canyon	1
Los Esteros	2

Equipment for testing coliform bacteria has been provided to the above listed projects. Testing will begin in the spring of 1981. The data will provide information for water contact activities. A gas cromatograph has been purchased by the district to specifically test high flows during flood periods for dissolved nitrogen. A program will be set up to train district and project personnel in equipment operation.

b. Fort Worth District.

(1) Goals. The goals of the Fort District water quality data collection program is to collect water quality data at all the existing projects in order to establish base-line conditions, monitor subsequent changes and identify water quality problems and resolve same where possible.

(2) Summary of Activities.

(a) Beginning FY 1981 collection of water quality data at the Fort Worth District has been expanded from eight lakes to 17 lakes to include Benbrook Lake, Lewisville Lake, Lavon Lake, Bardwell Lake, Grapevine Lake, Navarro Mills Lake, Whitney Lake, Waco Lake, Proctor Lake, Stillhouse Hollow Lake, North Fork Lake, Granger Lake, Somerville Lake, O. C. Fisher Lake, Hords Creek Lake, Canyon Lake and B. A. Steinhagen Lake.

(b) General lake water quality monitoring at various stations on each of the above lakes including monitoring at one tributary station and one reservoir outflow station will be performed three times a year by the USGS personnel under Cooperative Program with the Fort Worth District. Monitoring includes physical, chemical and biological quality determinations. This data is used to analyze the operating project's water quality conditions. Also, these data are used in preparing annual water quality summaries.

(c) In addition to the above sampling monthly dissolved oxygen and temperature profiles are collected by the project personnel at each of the existing projects. This data is used for thermal simulation modeling of lake projects during the design stage to determine multi-level outlet sizing and location.

(d) Water quality report for Benbrook Lake is being prepared and will be submitted to the Division before the end of calendar year 1980.

(e) We have completed our tests below Sam Rayburn Reservoir in connection with low dissolved oxygen levels. Our tests indicated that low dissolved oxygen levels definitely exist below Sam Rayburn Reservoir. Two methods to improve DO levels are being investigated: (1) construction of skimming weir: (2) deflector plate aeration method. Construction of skimming weir upstream from the power house was first investigated. The position of the crest of skimming weir is important in providing epilimnetic skimming. To determine the position of the weir crest, monthly temperature and DO profiles taken at Sam Rayburn Reservoir from 1970 through present were studied. These profiles indicated that the thermocline occurs about 25 to 35 feet below the water surface elevation. DO in the vicinity of thermocline was about 1.0 mg/l or less. Placing the crest of skimming weir below thermocline will not improve DO. Placing the crest at or above thermocline will no doubt minimize the drawing of hypolimnetic waters over the weir; however, it will limit adequate draw down of power pool. It will also increase the water temperature of the downstream area and could detrimentally affect the aquatic biota. While we are still studying skimming weir feasibility we are currently investigating using the deflector plate aeration method which has been successfully installed in Alabama Power Company Hydroelectric Projects. These are: the Bankhead, Holt, Logan, Martin and Martin Hydroelectric Projects. The defelector plate aearation method involves producing locally negative pressures in the draft tube by utilizing deflector plates attached to the draft tube. The deflector plate causes the flow to separate from the draft tube wall in the wake of the deflector plate and produces pressure in the wake region lower than the free stream static pressure. Venting the low pressure region to the atmosphere results in an aspiration flow into draft tube. This method of turbing aeration is inexpensive. This method is good when increase required in D.O. is less than 2 mg/l.

c. Galveston District.

(1) Barker Reservoir. The three year water quality program from Barker Reservoir was halted during FY 80 due to lack of funds in the district's O & M budget. Funds are available for FY 81 and the program is being resumed. The results of the study will be a detailed report showing the effects of the

length of impoundment on the quality and what release rates produced the most improvement downstream.

(2) Addicks Reservoir. The three year water quality program for Addicks Reservoir was halted during FY 80 due to lack of funds in the district's O & M budget. Funds are available for FY 81 and the program is being resumed. The results of the study will be a detailed report showing the effects of the length of impoundment on the quality and what release rates produced the most improvement downstream.

d. Little Rock District. The overall goal of the water quality management program is to improve or maintain water quality in the Little Rock District projects at the highest level possible, consistent with each projects' purposes, design, and funding. Specific objectives to achieve this goal will be identified as the District Water Quality Management Plan is approved and implemented. The district water quality management programs are divided among various elements of the Construction-Operations and Engineering Division by functional missions.

(1) Construction-Operations Division Responsibilities. The Permits Branch has been given the responsibility for conducting the district water quality program for Construction-Operations Division. The branch is composed of a Permits and Water Quality Section and a Compliance and Data Collection Section. Since the regulatory functions of the branch closely parallel functions of the division's water quality management program, field activities are very conveniently and efficiently combined to implement the programs. This is primarily due to the related procedural and logistical requirements of both regulatory functions and water quality activities. These responsibilities include the following programs relating to water quality management.

(a) Lake Monitoring. General lake water quality monitoring of all Little Rock District Lakes other than the main stem of the Arkansas River is presently performed three times per year on each lake at 6-8 stations at various depths. The field work is done by USGS personnel under Corps of Engineers contract. Approximately 26 parameters are measured to ascertain general lake water quality and to provide background data in abating water pollution. There are no state or other Federal programs which routinely provide these data on the main stem reservoirs operated by the Corps. Data obtained are maintained in the Permits Branch and are available from STORET and annual USGS Water Resources Data Publications for Arkansas and Missouri. Data obtained are used to evaluate long and short term water quality changes, to identify pollution sources, and to properly manage lake water quality. These evaluations include the identification of potential pollution sources so as to enable the Corps' influence to bear its persuasiveness at pressure points in decision making processes of others. This will assist project personnel and district officials in assuring that best management practices are followed for erosion control in development around lake areas and that best available technology is applied where domestic and industrial wastewater discharges are allowed in district lakes. These findings are published in water quality management reports and annual updates for each project.

(b) Discharge Permit and Operational Monitoring. Monitoring of district wastewater treatment systems and other NPDES discharges in Missouri and Arkansas is performed in accordance with NPDES permit requirements. Permits Branch personnel obtain the necessary monthly samples and the USGS laboratory analyzes these for BOD, bacteria, and suspended solids. Operational monitoring performed twice weekly by the sewage treatment plant operators includes PH, flow, cholorine residual, dissolved oxygen, and settleability. This program is conducted in accordance with Section 402 of the Clean Water Act. This program is implemented by the State in Missouri and EPA, Region VI in Arkansas.

(c) Bathing Beach Monitoring. Monitoring is performed five times monthly by resident area personnel on district bathing beaches during the swimming season to insure safe bacteriological quality of lake waters. Samples are analyzed by the Missouri and Arkansas Health Departments free of charge. A central log containing results for all projects is maintained by the Permits and Water Quality Section. This program is administered in accordance with SWD Regulation 1130-2-9 and applicable state laws.

(d) Potable Water Monitoring. Potable water supplies of the district are tested for physical, chemical, and bacteriological quality to insure their adequacy and safeness. Bacteriological samples are collected by resident area personnel and mailed to the appropriate health departments, which presently perform the analyses free of charge. Permits Branch personnel collect samples for complete chemical analysis by the health departments every 3 years from each water supply. Data obtained are used in an annual sanitary survey and report forwarded to SWD for reporting to OCE. This program is conducted as per ER 1130-2-407 and applicable Federal and state drinking water standards for non-community water supply systems.

(e) Dredged Material Analysis. A quarterly bottom sediment survey is performed at eight locations along the Arkansas River navigation project and less frequently at other locations on other district rivers and lakes. Sediment and water column samples are frozen and sent to SWD laboratory for sediment, water, and elutriate analyses. The purpose of this program is to detect potential effects of dredging operations on water quality. These operations include both commercial dredging under Corps permits and channel maintenance dredging performed under Corps of Engineers contracts.

(f) Pollution Complaints and Hazardous Substance Spill. Permits Branch receives calls reporting instances of pollution and hazardous substance spills and coordinates these reports with appropriate Federal and state officials. On occasions, branch personnel investigate these pollution complaints to verify existing conditions and determine effects on project operations. During oil and other hazardous substance spills, branch personnel participate in emergency containment and cleanup measures with Coast Guard and EPA officials and when so designated act as the Federal on-scene-coordinator for these two agencies.

(g) Special Studies. The Compliance and Data Collection Section routinely assists Engineering Division in obtaining samples and analyses for special water quality studies conducted by that division, such

as for planning purposes. Coordination is also accomplished with studies being performed by other agencies such as EPA, State Pollution Control, Health Department, Soil Conservation Service, etc.

(2) Engineering Division Responsibilities. There is no specific organization for water quality studies within Engineering Division. Responsibility is assigned to the various elements based on the nature of the program or study.

(a) Lake Profile and Release Monitoring. Water quality data have been collected from Beaver, Table Rock, Bull Shoals, Norfork, and Greers Ferry Lakes since 1966. Presently, monthly profiles of PH, temperature, dissolved oxygen, and specific conductance are obtained from the five lakes, as well as a grab sample below each dam. Additional profiles are obtained from Table Rock Lake during critical times of the year. These data are used in the design of operating features needed for perventing or lessening water quality problems downstream of the dams. They also contribute to the water control management activities required to maximize dissolved oxygen concentrations in the fall releases from Table Rock and to maintain acceptable temperatures downstream of all lake projects from May through October. Hydraulics Branch is responsible for this program and data collection is contracted to USGS. The program was expanded in FY 81 to include Blue Mountain, Clearwater, and Nimrod Lakes. Similar data collection at DeQueen, Dierks, Gillham, and Millwood Lake will begin in April 1981.

(b) Instream Flow Problems and Needs Evaluation. Details on this study are in paragraph 5 of this section.

(c) Special Studies. The Planning and Hydraulics Branches periodically conduct water quality studies as part of normal project planning efforts such as preparation of survey reports, design memoranda, and environmental impact statements. Certain special water quality related studies are identified below:

Table Rock Dissolved Oxygen. The impacts of various levels of dissolved oxygen in the releases from Table Rock Lake are being studied: how they affect the fishery in Lake Taneycomo and the socioeconomics of the surrounding area. Alternative solutions will also be investigated as appropriate. The study is being conducted by SWD and LRD, with contractual assistance from the Missouri Department of Conservation, USGS, and Tulsa District.

Greers Ferry Lake Environmental Protection Study. The Planning Branch has recently initiated this 208 Water Quality Management-type study, which will also address solid waste disposal needs.

Little Rock Metro Urban Study. This study, which included a 208 WQM study, will be completed in FY 81. Most of the water quality work, which included data collection, modeling, and evaluation was contracted.

Norfork Units 3 & 4 Feasibility Study. An essential part of this study is an evaluation of the water quality impacts of the proposed

pumpback units and afterbay on Norfork Lake, within the proposed afterbay, and downstream on the North Fork and White Rivers.

White River Lakes Study. This study includes an evaluation of how the release schemes of Bull Shoals, Norfork, and Greers Ferry Lakes might be modified to minimize adverse water quality impacts downstream.

Taylor Bay Siltation Study. This study investigated the effects of suspended sediment on fishing in Taylor Bay near Augusta, Arkansas. The sources of the silt were identified and alternate solutions were developed, but none of these alternatives were economically feasible. Thus a recommendation to terminate the study has been made.

(3) Laboratory Capabilities. Water quality analyses performed at the district level are limited to the following capabilities:

(a) Field testing of water quality which may be conducted by Corps personnel includes dissolved oxygen, temperature, PH, specific conductivity, Secchi Disc measurements and others using HAC field test kits approved by EPA.

(b) A small laboratory located in Construction-Operations Division can perform the following analyses: dissolved oxygen, color, turbidity, alkalinity, hardness, and others using colorimeter methods for analyses.

(4) Data Management. Lake water quality data collected and analyzed by USGS are entered into WATSTORE and STORET, the computerized data management systems of the USGS and SPA, respectively. These data are also published in the annual USGA water resources reports for Arkansas and Missouri. Results of potable water, bathing beaches, NPDES, and other monitoring are kept in log books or files as appropriate. Special data collection results are contained in the reports dealing with the specific subject for which data were collected.

(5) Future Water Quality Management Program. A comprehensive coordinated District Water Quality Management (WQM) Plan is being developed. It will assign responsibilities for the various aspects of the overall program and establish guidelines for assigning responsibility for new programs and studies. A District Water Quality Committee is being established. It will guide the development of the WQM Plan, periodically evaluate the program and help establish priorities for future work. A major feature of the plan will be the establishment of a 3 phase process for evaluation of all projects. Phase 1 would result in specific WQM objectives for each project based on a preliminary assessment of available data. Phase 2 would involve collecting data, developing and assessing alternatives, and recommending programs to meet the project objectives. Phase 3 would be implementation of the recommended plan and monitoring to assess its success.

Funds have been requested for FY 82 to establish a STORET account, assess nitrogen supersaturation potential at selected projects, and assess the performance of the unique outlet structure design at the Conway Water Supply project.

e. Tulsa District. In the past, fish kills have occurred downstream of Denison, Eufaula and Keystone Dams. Although the cause of these events has not been established, a condition of low levels of dissolved oxygen is known to exist in the river reach immediately downstream of these dams during late summer and early fall. Power projects such as Denison, Eufaula and Keyston, typically release water from the hypolimnionic zone of the lake which is usually anoxic during this period of this year. All three projects exhibit a high oxygen demand in the releases which leads to oxygen depletion during periods of no release. During the summer - fall period of 1980, D.O. levels along with other water quality data were taken at Denison and Eufaula.

(1) At Lake Texoma (Denison), studies were conducted to evaluate various regulation procedures designed to provide 9 quick responses to potential fish kills, and 6 long term regulation procedures which would enhance the downstream fishery. At Pine Creek Lake tests to determine ways of improving the downstream releases during periods of stratification by pumping surface water down to the intake were conducted jointly by the Corps of Engineers and Oklahoma Sate University.

(2) Cooperation with the Waterway Experiment Station and the U.S. Fish and Wildlife Service in the study to determine the effects of release rates on downstream fishery and biota below Pine Creek and Gillham was continued.

(3) Tulsa District's annual report of water quality activities is included as inclosure 1 at the end of this section.

3. SEDIMENT PROGRAM AND ACTIVITIES.

a. Albuquerque District.

(1) Revised elevation-area-capacity data for Abiquiu, Los Esteros and Trinidad were computed in FY 80. The new Abiquiu data were based on the May 1978 survey of sedimentation ranges; the Los Esteros data were based on re-planimetering of the project mapping; and the Trinidad data were based on digitized cross sections from 1977 aerial photography.

(2) With the use of the Tulsa District's hydrographic surveying equipment and personnel, the sediment ranges in the lower portion of John Martin Reservoir were surveyed in April and June 1980. Recomputation of the elevation-area-capacity data will be completed when the remaining sedimentation ranges are surveyed with photogrammetric methods in September 1980.

(3) Contracts with the U.S. Geological survey were completed in January and September 1980 which provided for the survey of 37 existing ranges on the Rio Grande between Cochiti Lake and Isleta, N. M. Suspended sediment and surface bed samples were also collected and analyzed. These data, in conjunction with previous data from pre-dam and post-dam surveys, will allow detailed analyses of the effects of the operation of Cochiti, Jemez Canyon and Galisteo on the geomorphological characteristics of the Rio Grande. LTC Peter F. Lagasse of the Science Research Laboratory at West Point will complete a report to the Albuquerque District in early FY 81 which will analyze changes occurring to the stream characteristics below Cochiti.

(4) A contract was negotiated in November 1979 with Simons and Li Engineering of Fort Collins, Colorado to provide a sedimentation study of the Rio Grande between Cochiti and Elephant Butte Lake with special emphasis on the Rio Puerco and Rio Salado. A portion of this contract will be to apply mathematical models to predict the long-term response of the Rio Grande to the operation of the existing Middle Rio Grande flood and sediment control projects. The contract will be completed in early 1981.

b. Fort Worth District. No sedimentation resurveys were initiated during the year. Funds scheduled for resurveys of Bardwell and Navarro Mills were not approved. These projects are rescheduled in FY 1981.

c. Galveston District.

(1) Barker Reservoir. No sediment work was conducted at Barker Reservoir during FY 80.

(2) Addicks Reservoir. No sediment work was conducted at Addicks Reservoir during FY 80.

d. Little Rock District. Suspended sediment samples are collected at 10 stations. The 247 sediment ranges on the main stem of the Arkansas River are resurveyed as near annually as funds and survey workload permit. From October 1979 through September 1980, there were 166 ranges scheduled for

resurveying and 162 ranges were resurveyed in FY 1980. There are scheduled 143 ranges to be resurveyed in FY 1981. Fifty four tributary ranges are resurveyed less frequently when appreciable deposits are suspected. About 50 index ranges out of 350 sediment ranges in the other eight lakes are resurveyed at 10 year intervals. During the period from October 1979 through September 1980, none were resurveyed. The updating of old sediment surveys with new surveys has been time consuming and costly in the past and new computer equipment software has been purchased and in use to manipulate the data which speeds up the operation considerably. One of the most significant accomplishments during FY 80 was getting sediment range data for the Arkansas River stored on disc and tape on the division computer. Using a Tektronix 4014, 4954, and 4663 allows for rapid data retrieval and data update. We plan to do the same thing with future sediment ranges surveyed for other lakes in the district.

e. Tulsa District. The following activities were accomplished during 1980. Installation of monuments and initial survey of sedimentation and degradation ranges on Big Hill Lake were completed. Segmental elevation - area data for Big Hill was developed. Pole monuments were installed on sedimentation ranges at Council Grove, Kaw, Keystone, Eufaula, Hulah and Texoma Lakes for use in making hydrographic resurveys during flood stages. Draft reports on resurvey of sedimentation and degradation for Canton and Texoma Lakes were completed. Analysis of resurvey data for Robert S. Kerr, Webbers Falls, and John Redmond are being conducted. Hydrographic survey data was collected for Ft. Worth and Albuquerque Districts on Lewisville, Caddo and John Martin Lakes. Suspended sediment samples were collected at 17 sites.

4. COOPERATIVE PROGRAMS.

a. Albuquerque District.

(1) The weather station at Los Esteros was installed by the Weather Bureau under the FC-48 network.

(2) Stream gages required for project operation and project studies are operated under a cooperative agreement with the U. S. Geological Survey. The total number of stations in the program are 50, at a district cost of $171,610. The number of stations per basin are as follows:

Basin	Number of Stations	Cost
Arkansas	14	$40,290
Canadian	5	12,070
Rio Grande	19	54,910
Pecos	12	64,340

(3) In review of the Cooperative Stream Gaging Program for FY 81, the district has decided to discontinue four stream gaging stations and two sediment collection stations. The six stations which were eliminated are:

Station No.	Stream	Location
07124000*	Arkansas R.	at Las Animas, CO
07128500*	Purgatorie R.	at Las Animas, CO
08216500	Willow Cr.	Creede, CO
08353000	Rio Puerco	near Bernardo
08393200	Rocky Arroyo	above Two Rivers Res.
08393300	Rocky Arroyo	below Two Rivers Res.

* Sediment Stations

One new gage, #0839500, on the Rio Hondo at Roswell, New Mexico is added in the FY 81 program. This gage will serve as a control point for the Two Rivers project.

b. Fort Worth District.

(1) National Weather Service. Funds were transferred by FWD to the NWS in the amount of $67,980 for FY 1980. Under on-going programs the Corps collects rainfall at project offices while the NWS collects all other rainfall reports and maintains weather stations, including those at Corps' projects. Rainfall summaries are transmitted to Corps via teletype, telephone, and a daily computer printed map which displays current totals for reporting stations. Supplemental and accumulative storm total printouts are provided upon request. Additional hydromet information was received from the NWS via the teletype circuits and AFOS. Radar scans were obtained on facsimile copier via a direct connection to the NWS Stephenville radar sites at Galveston, Hondo, and Brownsville, Texas, and into Oklahoma City, Oklahoma. Continous updates are possible during storm periods.

(2) U. S. Geological Survey.

(a) General. The U.S.G.S. performed operation and maintenance on all stream flow, lake level, sediment sampling and some water quality stations in cooperation with the district. In addition, they arranged for reporting at river stages during flood events, made supplemental flow measurements, and processed all published data.

(b) Funds. The Fort Worth District transferred to the U.S.G.S. for the Cooperative Stream Gaging Program a total of $364,210 in FY 1980. Table 1 indicates the number of stations, the types of funds for each of several groups of stations and both the U.S.G.S. and the CE contributions toward the total station cost.

c. Galveston District.

(1) Barker Reservoir. Two cooperative programs are in existence in relation to the operation of Barker Reservoir. The program with the U.S.G.S. provides the operation and maintenance for the gages that furnish streamflow and reservoir content data used in the operation of the project. The program with the National Weather Service provides for the operation and maintenance of the precipitation gages and collection of data used in project operation. This project shares some of the streamflow and precipitation data used in the operation of the adjacent Addicks Reservoir.

(2) Addicks Reservoir. Two cooperative programs are in existence in relation to the operation of Addicks Reservoir. The program with the U.S.G.S. provides the operation and maintenance for the gages that furnish streamflow and reservoir content data used in the operation of the project. The program with the National Weather Service provides for the operation and maintenance of the precipitation gages and collection of data used in project operation. This project shares some of the streamflow and precipitation data used in the operation of the adjacent Barker Reservoir.

d. Little Rock District. Approximately 176 rainfall and/or river stage reporting stations were operated by the National Weather Service and the Corps of engineers in or near the Little Rock District. Of these, 112 stations are in the cooperative program within the Lower Arkansas Reporting Network (FC-16). The remaining 64 stations are operated solely by the National Weather Service within or near the Little Rock District. Six of these stations are airway stations that report at 6-hour intervals. Reports from these stations are used in forecasting streamflows for flood warning and operation of reservoir projects. The stream gaging data required by the District are collected under a cooperative agreement with the U.S.G.S. During the fiscal year, 83 stations were operated, of which 54 were operated cooperatively and 20 were operated by the Corps of Engineers. The FY 1980 total cost for collection of streamflow and some sediment data was $294,780 of which $164,360 was transferred to U.S.G.S. The FY 1981 cooperative program was reduced by 14 stations and contemplates a cost of $355,195 of which $217,465 will be transferred to U.S.G.S.

EXPERIMENT FORM (March 1976)

SOUTHWESTERN DIVISION

FORT WORTH DISTRICT
15 August 1979 DATE OF PREPARATION
REPORTS CONTROL SYMBOL DAEN-CWE-14

TABLE 1

PROPOSED COOPERATIVE STREAMFLOW DATA PROGRAM SURVEY
FOR
FISCAL YEAR 1980
PART A

STATIONS IN COOPERATIVE PROGRAM WITH USGS

G R O S S D O L L A R S S U P P O R T I N G P R O G R A M

PROPOSED TRANSFER TO USGS FROM CORPS

CLASS OF FUNDS	NUMBER OF STATIONS	USGS AER FUNDS	GEN INVES	CONST GEN	O&M	TOTAL	TOTAL CE/USGS PROGRAM	FOR CORPS OPERATION	OTHER USGS FUNDS	TOTAL FOR CIROS	TOTAL STATION SUPPORT
B	4	0	13,720	0	0	13,720	13,720	600	4,100	14,320	18,420
C	12	9,150	0	0	0	0	9,150	860	0	860	10,010
D	6	0	0	11,890	0	11,890	11,890	1,080	24,100	12,970	37,070
E	66	0	0	0	228,950	228,950	228,950	10,350	28,130	239,300	267,430
F	22	0	0	109,650	0	109,650	109,650	4,860	7,430	114,510	121,940
SUBTOTAL	110*	9,150	13,720	121,540	228,950	364,210	373,360	17,750	63,760	381.960	454,870

*Note: Total is 1 less than shown
Station 08110200 has dual
funding.

PART B
TOTAL STREAMFLOW DATA PROGRAM FOR CORPS OF ENGINEERS

CLASS OF FUNDS	TOTAL	COST FOR CORPS OPERATION	NUMBER OF STATIONS	COST FOR CORPS STATIONS	CORPS GRAND TOTAL COST
B	13,720	600	*NONE*	*NONE*	14,320
C	0	860			860
D	11,890	1,080			12,970
E	228,950	10,350			239,300
F	109,650	4,860			114,510
TOTAL	364,210	17,750			381,960

CLASS OF FUNDS:

B - Surveys
C - General Coverage
D - Advance Engineering and Design
E - Operation and Maintenance
F - New Work or Construction

e. Tulsa District. Much of the information required for regulation, investigation and design of our water resources projects results from the reporting and measurement of flow, water quality, and sediment provided by a cooperative steam gaging program with the U.S.G.S. During FY 1980 this cooperative program included 265 stations of which 46 were operated independently by the Corps of Engineers. The gaging program in the Tulsa District cost $728,195 in FY 1980 with $535,975 of this being transferred to the U.S.G.S. for operation of stations. The following tabulation shows a breakdown of the program by class of funds used to finance the program.

Class of Funds	No. of Stations	C of E Cost
Survey Investigation General Coverage	27	$ 10,290
Planning	2	4,230
Operation & Maintenance	229	685,550
New Work & Construction	7	28,125
Total	265*	$728,195

* Some stations are counted under more than one classification.

5. INSTREAM FLOW STUDY.

a. Albuquerque District. As required by EC 1110-2-214, instream flow problems and needs were evaluated for the district's existing reservoir projects. The results of these evaluations are presented in part III of this report.

b. Fort Worth District. In response to Engineering Circular (EC 1110-2-214) entitled "Instream Problems and Needs Evaluation", a project by project evaluation of all the existing FWD projects were made. The results of the subject evaluation are shown in part III of this report.

c. Galveston District. In accordance with EC 1110-2-214 the district existing projects were evaluated and study results are shown in part III of this report.

d. Little Rock District. In response to EC 1110-2-214, the following projects were evaluated: Beaver, Table Rock, Bull Shoals, Norfork, Clearwater, Greers Ferry, Nimrod, Blue Mountain, Dardanelle, Ozark, and Pool No. 2. The evaluations consist of assessing how the projects change the quality and quantity of water entering and leaving the projects; determining if and how these changes cause problems with the authorized and/or desired operation of the projects; and identifying alternative solutions to any problems. The primary quality problem is the release of degraded water from the lower depths of stratified lakes. At hydropower projects, the primary quantity problem is the conflict between downstream recreational use, the highly variable power releases and the occasional lack of adequate releases of cold water to maintain temperatures needed in downstream trout fisheries. Evaluation of the individual projects indicated a need for the following special studies:

(1) Nimrod Lake - Determine the feasibility of various methods of avoiding the discharge of undesirable levels of constituents such as hydrogen sulfide, dissolved oxygen, turbidity, etc. Study would cost approximately $35,000 and would take 18 months to complete.

(2) Blue Mountain - Similar to Nimrod study; study would cost $15,000 and would take 12 months to complete.

(3) Clearwater - Determine the source and effects of heavy metals in the lake and its releases; study would cost $10,000 and would take 9-12 months to complete.

(4) Greers Ferry - Determine the optimum release scheme that will minimize adverse temperature conditions downstream; this study would cost $20,000 and would take approximately 6 months to complete.

The complete evaluation reports are shown in part III of this report.

e. Tulsa District. In accordance with EC 1110-2-214 a cursory review was made of available water quality and stream flow data for the purpose of evaluating instream flow problems and needs. The review and evaluation were made by an interdisciplinary team consisting of personnel from both the

Engineering and Operations Divisions of the district. See part III of this report for results of evaluation.

Water Quality Management of Corps

Civil Works Facilities

1. Tulsa District Water Quality Management Program

a. Goal. Maintain water quality at TD projects at the highest level possible, consistent with each projects purpose, design, and funding.

b. Objective. To determine, by 1984, existing water quality at each project identify any water quality problems, develop and implement solutions to correctable problems, and to monitor project water quality to maintain it at a high level.

c. Program. To meet the above objective, an organized sampling program was implemented in 1979 to provide baseline information on approximately 8 projects annually. This will allow completion of all operating and planned projects by 1984. To facilitate comparison of results between projects, a standard report format for use by both contracted and inhouse studies was developed. Routine monitoring of projects will be tailored to the results of the baseline studies, thereby reducing costs and effort.

d. Organization. TD OM 1105-2-2, Water Quality, details responsibilities for water quality management for civil works projects in the Tulsa District. It gives the following responsibilities to the various elements.

Incl 1

(1) Engineering Division (Environmental Resources Branch)

(a) Acts as coordinator for water quality studies in Tulsa District.

(b) Plans and executes operational and preimpoundment baseline water quality studies.

(c) Serves as the central storage point for water quality data collected by Tulsa District.

(d) Provides technical assistance in the development and review of water quality aspects of preauthorization reports, design memorandums, plans, specifications, and in construction activities.

(e) Provides staff coordination with Federal and State agencies on matters pertaining to water quality studies.

(f) Prepares the water quality portion of master plans.

(g) Prepares Appendix A for water quality study contracts.

(h) Obtains water quality information for Section 404 permits on projects in the Survey and AE-D stages.

(i) Monitors water quality of preimpoundment and operational projects to insure no degradation occurs.

(j) Prepares the District Water Quality Management Report.

(2) Engineering Division (Hydrology-Hydraulics Branch)

(a) Plans and executes studies needed to determine the effects of discharges on downstream water quality.

(b) Collects temperature and dissolved oxygen profiles needed to regulate multiple outlet discharge structures.

(3) Operations Division (Navigation Branch)

(1) Obtains water quality information as necessary for Section 404 permits on operational projects and other waters of the United States.

(2) Coordinate Section 404 permit activities with Federal and State agencies.

(4) Operations Division (Recreation-Resource Management Branch)

(a) Monitors project swimming beaches and water supplies for compliance with applicable regulations and laws.

(b) Acts as coordinator for matters pertaining to pollution violations, spills of oil and hazardous materials on operating projects.

(c) Plans and executes water quality monitoring in conjunction with the Tulsa District Aquatic Plant Control Program on operating projects.

(d) Prepares the district report for prevention, control, and abatement of environmental pollution at Federal facilities.

(e) Prepares, updates, and executes the district spill prevention containment and countermeasure plan.

e. Technical Capabilities Within TD. The District has the following personnel capabilities for water quality studies.

1. Hydraulic Engineer - 2 H-H Br
2. Water Quality Biologist - 1 Env Res Br
3. Environmental Chemist - 1 Env Res Br
4. Fishery Biologist - 2 Env Res Br
5. Aquatic Ecologist - 1 Env Res Br
6. Env Specialist - 2 Rec Res Br
7. Sup Biologist - 1 Rec Res Mgmt Br

Additionally, the District is knowledgeable in organochlorine contamination problems. Staff members published two articles in major scientific journals dealing with the subject during CY 80.

f. Relationships between water quality and water control managment. Effective coordination is maintained between H-H Br, Env Res Br, and Rec-Res Mgmt Br to insure problems are identified, and solutions are developed and implemented. Efforts to determine the cause of fishkills below Denison Dam are an example of this relationship, which is coordinated by a District water quality committee.

g. Contracted Workload. It is desirable to retain a portion of water quality studies in-house to provide needed equipment, maintain professional skills, and insure quality products. Personnel limits prevent all work being done by TD employees, and the following details contracted work.

a. FY 80 - $214,000

b. FY 81 - $ 25,000*

*The FY 81 budget has not been finalized at the time this report was prepared.

h. Laboratory Facilities. The Tulsa District has an environmental work-room equipped to perform basic water quality tests. An employee of Env Res Br is available to perform these analyses. Testing for organochlorine residues and most heavy metals is beyond the capabilities of this workroom.

i. Data Management Systems. The Tulsa District actively utilized both STORET and WATSTORE. The District has established 135 stations under STORET, and has 3 employees trained in its use.

j. Training. A water quality training course has been developed by Env Res Br and H-H Br. This course was presented twice within the district during CY 80, and is available for future presentation. The following training, applicable to water quality studies, was completed by TD personnel in 1980.

Course	Individuals
Analysis of Env Contaminants (OK. St. Univ.)	1
STORET Basic Course (EPA)	1
STORET Advanced Course (EPA)	2

k. Coordination With Other Agencies. Adequate coordination with other agencies has been maintained during CY 80. Of special interest, the TD was represented on the Oklahoma Governor's Task Forces on PCB's Pollution and on mineralized water intrusion in Northeast Oklahoma.

2. Water Quality Studies Accomplished in 1980.

a. Birch Lake Baseline Study. Env Res Br conducted a baseline study of this project, which was impounded in 1977. Analysis of this data is continuing; however, no problem areas have been detected.

b. Elk City Lake Baseline Study. A final report on this study was received from Emporia State University in September, 1980. It indicated no significant water quality problems.

c. <u>Eufaula Lake Baseline Study</u>. Env Res Br has completed collecting and storage of data for this study. Detailed analysis and compilation of this information is pending.

d. <u>Fall River Lake Baseline Study</u>. A final report on this study was received from Emporia State University in September, 1980. It indicated no significant water quality problems.

e. <u>Heyburn Lake Baseline Study</u>. Tramet Inc., the contractor for this study, has experienced difficulty in some organic analyses. A final report is expected in February, 1981.

f. <u>Hulah Lake Baseline Study</u>. The contractor, Aquatic Life Consultants, has had problems with a new atomic absorption instrument. These problems have been corrected and a final report is anticipated in February, 1981.

g. <u>Oologah Lake Baseline Study</u>. Final results of this study have not been compiled. Initial results show no serious water quality problems.

h. <u>Webbers Falls Baseline Study</u>. This study, conducted by Env Res Br, has shown some fish contained polychlorinated biphenyls at levels above FDA guidelines. Further investigation by the Oklahoma State Health Department showed the violations were not major, and were an indication of PCB contamination throughout the Arkansas River.

i. Big Hill Lake Pre-impoundment Study. This study, which extended for 3 years, was completed in 1980. The results indicate no serious water quality problems and have been used for water supply usage studies.

j. Ft. Supply Water Supply Study. Designed to determine the suitability of Ft. Supply water for municipal use, this study is continuing into CY 1981.

k. Skiatook Pre-impoundment Study. Conducted over a three-year period, this study was designed to predict water quality after impoundment. A final report has been completed and indicates no severe water quality problems.

l. Palo Duro Pre-impoundment Study. This study was begun in 1980 and was designed to predict water quality of the lake. Funds were expended by other elements before the study was completed, however funds will be replaced in FY 81.

m. Lake Texoma Water Supply Study. A final report was received from the contractor, North Texas State University, in 1980. This study sought to determine the suitability of the water for municipal usage and to locate areas of high quality water.

n. Kaw Lake Trihalomethane Study. Initial tests by a consulting company indicated Kaw Lake water exhibited elevated Trihalomethane Formation Potential. William Brothers Engineering was contracted to determine operational techniques which could be used to reduce the problem near the water intake. The study is continuing into FY 81.

o. Lake Texoma Stilling Basin Tests. Extensive monitoring of selected water quality parameters in the intake and release was conducted during summer and fall, 1980. The purpose was to determine water quality of releases and effects of releases on downstream fish populations. Temperature, dissolved oxygen, conductivity, pH, BOD, ammonia nitrogen, and sulfide were monitored. Iron and manganese concentrations were determined infrequently.

A series of three different tests was conducted to determine if improvements in DO in the release were possible. The effects of a continuous release of 50 cfs, a slug release of 10,000 cfs, and pumping surface water to the intake were studied. Reports on the findings of the tests and monitoring are being prepared by H-H Br.

p. Table Rock Lake Computer Simulation. A computer simulation model of temperature and dissolved oxygen was developed by the H-H Br. The model was used to predict changes in the temperature and DO patterns caused by different lake management practices. A report was prepared in September 1980. The work was performed by the Tulsa District for the Little Rock District.

3. R&D and Special Study Requirements.

a. A 1980 overview of instream flow conditions below TD projects indicates the need for intensive examination of conditions below some lakes. Funding shall be sought for such studies below Texoma, Hugo, Tenkiller, Keystone, Broken Bow, Eufaula, Oologah, Pine Creek, and Wister.

b. R&D studies aimed at devising a convenient cost-effective strategy for priority pollutant scans should be investigated.

c. Hugo Lake. High concentrations of manganese in the hypolimnion have caused municipal water supply problems for the city of Hugo. Construction of a multi-level intake structure is being considered by city officials. Low flow releases are believed to have high manganese concentrations. Env Res Br has received $12,600 for water quality studies at Hugo in 1981 and the situation in the lake will be investigated.

d. Council Grove Lake. Several hundred shad and drum have been killed during December 1980. Apparently, schools of fish have entered the low flow pipe, clogged the control valve, and died. Although the Kansas Fish and Game Commission felt the loss of the fish was not significant, operational problems associated with flushing the low flow pipe may necessitate modification of the intake trash rack.

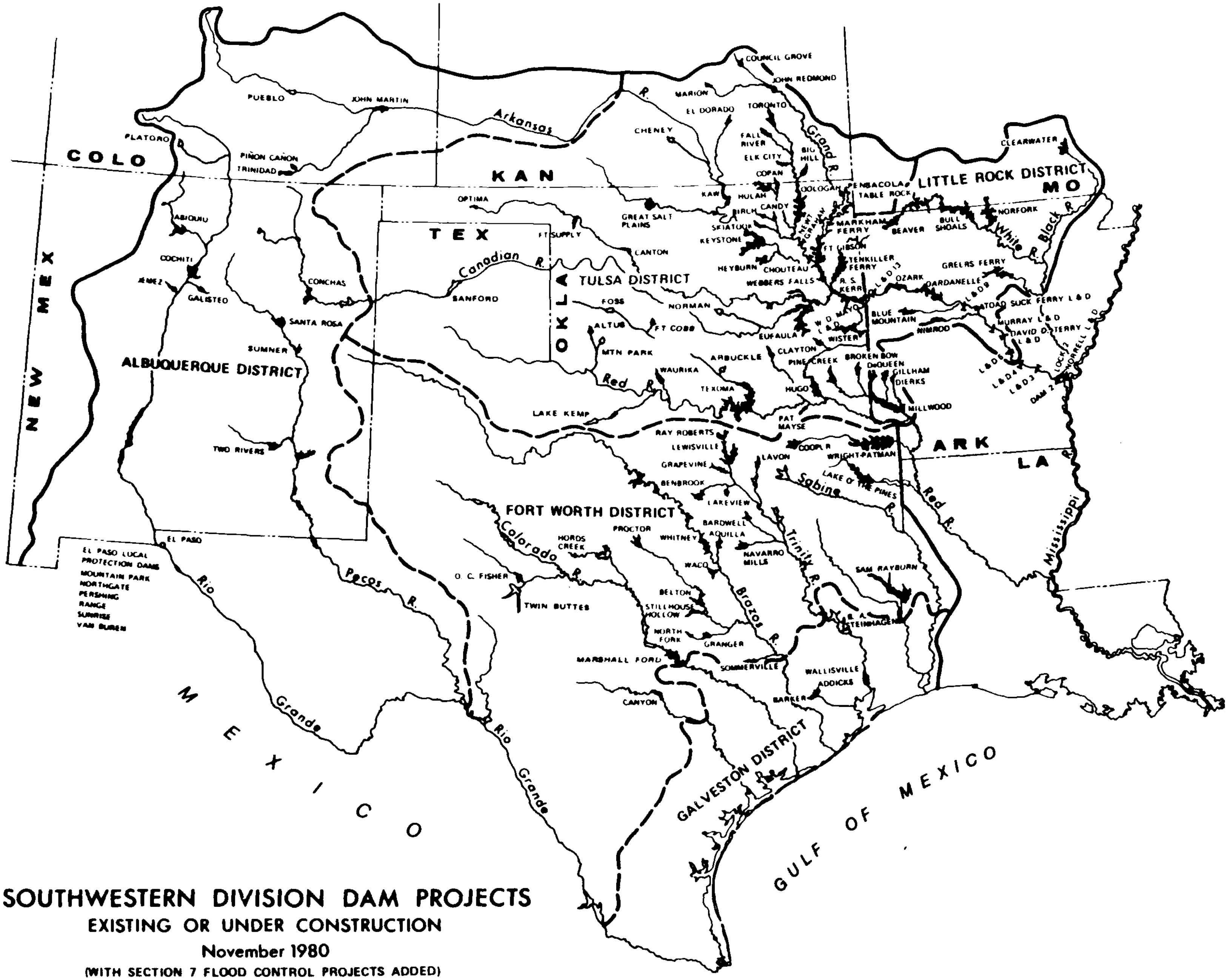
e. Great Salt Plains Lake. To avoid a fishkill due to low DO conditions in the stilling basin, a continuous 6 cfs release was made through much of the summer period. The release seems adequate, however, future studies are being considered. A regulation change to incorporate the low flow release is also being considered.

f. Hulah Lake. A continuous release of about 1 cfs was made through the summer period to increase DO in the stilling basin. The release seemed adequate to avoid a fishkill in the basin. A regulation change to include the 1 cfs release is being considered.

g. <u>Protection of Water Quality Releases.</u> In the past several years, improper diversions have severly reduced the flows of the Verdigris. An agreement with the Kansas Water Resources Board is being developed which will give the KWRB the legal power to protect releases for water quality in the Verdigris River basin. An agreement to protect releases in the Arkansas River basin in Kansas will also be sought.

SECTION VII - RESERVOIR DATA SUMMARY

1. SWD Map
2. Index By Basins
3. Index in Alphabetical Order
4. Data Tables



SOUTHWESTERN DIVISION DAM PROJECTS

EXISTING OR UNDER CONSTRUCTION

November 1980

(WITH SECTION 7 FLOOD CONTROL PROJECTS ADDED)

LAKE SUMMARY TABLE INDEX

LAKE NAME	STREAM	DIST	STATE	YR COMP	POOL ELEVATION CONS	POOL ELEVATION FC	CAPACITY 1000 AF CONS	CAPACITY 1000 AF FC	PAGE NO
			WHITE RIVER BASIN						
Beaver	White	LRD	AR	66	1120.0	1130.0	1652	300	1
Table Rock	White	LRD	AR/MO	58	915.0	931.0	2702	760	1
Bull Shoals	White	LRD	AR/MO	52	654.0	695.0	3048	2360	2
Norfork	North Fork	LRD	AR/MO	45	552.0	580.0	1251	732	2
Clearwater	Black	LRD	MO	48	494.0	567.0	22	391	3
Greers Ferry	Little Red	LRD	AR	62	461.0	487.0	1911	934	3
			ARKANSAS RIVER BASIN						
Pueblo	Arkansas R	AD*	CO	74	4880.6	4898.7	264	93	4
Trinidad	Purgatoire R	AD	CO	78	6226.4	6260.0	64	58	4
John Martin	Arkansas	AD	CO	51	3851.0	3870.0	351	270	5
Cheney	N F Ninnescah	TD*	KS	64	1421.6	1429.0	167	81	5
Eldorado	Walnut	TD	KS	80	1339.0	1347.5	157	79	6
Kaw	Arkansas	TD	OK/KS	76	1010.0	1044.5	429	919	6
Great Salt Plains	Salt Fork Ark	TD	OK	41	1125.0	1138.5	31	240	7
Keystone	Arkansas	TD	OK	64	723.0	754.0	618	1219	7
Heyburn	Polecat Cr	TD	OK	50	761.5	784.0	7	48	8
Toronto	Verdigris R	TD	KS	60	901.5	931.0	22	178	8
Fall River	Fall	TD	KS	49	948.5	987.5	24	235	9
Elk City	Elk	TD	KS	66	792.0	825.0	34	256	9
Big Hill	Big Hill Cr	TD	KS	81	858.0	867.5	27	13	10
Oologah	Verdigris R	TD	OK	63	638.0	661.0	553	966	10
Hulah	Caney	TD	OK/KS	51	733.0	765.0	36	258	11
Copan	L Caney	TD	OK/KS	80	710.0	732.0	43	184	11
Birch	Birch Creek	TD	OK	79	750.5	774.0	19	39	12
Skiatook	Hominy Creek	TD	OK	82	714.0	729.0	305	182	12
Newt Graham LD 18	Verdigris	TD	OK	70	532.0	-	24	0	13
Chouteau LD 17	Verdigris	TD	OK	70	511.0	-	23	0	13
Council Grove	Neosho R	TD	KS	65	1270.0	1289.0	38	76	14
Marion	Cottonwood R	TD	KS	68	1350.5	1358.5	86	60	14
John Redmond	Neosho R	TD	KS	64	1039.0	1068.0	82	563	15
Grand Lake	Neosho (Grand)	TD*	OK	40	745.0	755.0	1672	525	15
Lake Hudson	Neosho (Grand)	TD*	OK	64	619.0	636.0	200	244	16
Fort Gibson	Neosho (Grand)	TD	OK	52	554.0	582.0	365	919	16
Webbers Falls LD 16	Arkansas	TD	OK	70	490.0		165	0	17
Tenkiller Ferry	Illinois R	TD	OK	52	632.0	667.0	654	577	17
Conchas	Canadian R	AD	NM	39	4201.0	4218.0	330	198	18
Meredith	Canadian R	TD*	TX	65	2941.3	2965.0	945	463	18
Thunderbird	Little R	TD*	TX	65	1039.0	1049.4	120	77	19
Optima	N Canadian R	TD	OK	78	2763.5	2779.0	129	101	19
Fort Supply	Wolf Cr	TD	OK	42	2004.0	2028.0	14	87	20
Canton	N Canadian R	TD	OK	48	1615.2	1638.0	116	268	20
Eufaula	Canadian R	TD	OK	64	585.0	597.0	2329	1470	21
R S Kerr LD 15	Arkansas	TD	OK	70	460.0	-	494	0	21
W D Mayo LD 14	Arkansas	TD	OK	70	413.0	-	16	0	22
Wister	Poteau R	TD	OK	49	471.6	502.5	27	400	22
LD 13	Arkansas	LRD	AR/OK	69	392.0	-	54	0	23
Ozark-J T LD 12	Arkansas	LRD	AR	69	372.0	-	148	0	23
Dardanelle LD 10	Arkansas	LRD	AR	64	338.0	-	486	0	24
Blue Mountain	Petit Jean	LRD	AR	47	384.0	419.0	25	233	24
LD 9	Arkansas	LRD	AR	69	287.0	-	65	0	25
Toad Suck Ferry LD 8	Arkansas	LRD	AR	69	265.0	-	35	0	25
Nimrod	Fourche La Fave	LRD	AR	42	342.0	373.0	29	307	26
Murray LD 7	Arkansas	LRD	AR	69	249.0	-	87	0	26
D D Terry LD 6	Arkansas	LRD	AR	68	231.0	-	50	0	27
LD 5	Arkansas	LRD	AR	68	213.0	-	65	0	27
LD 4	Arkansas	LRD	AR	68	196.0	-	70	0	28
LD 3	Arkansas	LRD	AR	68	182.0	-	46	0	28
LD 2	Arkansas	LRD	AR	67	162.0	-	110	0	29
LD 1	Arkansas	LRD	AR	67	142.0	-	2	0	29

* Section 7 Flood Control Projects
Includes dead storage, conservation, water supply, power, irrigation, etc.

RED RIVER BASIN

Altus	N F Red	TD*	OK	46	1559.0	1562.0	141	21	30
Tom Steed	W Otter Creek	TD*	OK	75	1411.0	1414.0	96	20	30
Lake Kemp	Wichita R	TD*	TX	77	1144.0	1156.0	299	225	31
Waurika	Beaver Creek	TD	OK	78	951.4	962.5	203	140	31
Foss	Washita	TD*	OK	61	1652.0	1668.6	256	181	32
Fort Cobb	Cobb Creek	TD*	OK	59	1342.0	1354.8	78	64	32
Arbuckle	Rock Creek	TD*	OK	67	872.0	885.3	72	36	33
Lake Texoma	Red	TD	TX/OK	45	617.3	640.0	2836	2660	33
Pat Mayse	Sanders Creek	TD	TX	68	451.0	460.5	124	65	34
Hugo	Kiamichi R	TD	OK	74	404.5	437.5	157	809	34
Pine Creek	Little R	TD	OK	69	443.5	480.0	78	388	35
Broken Bow	Mountain Fork	TD	OK	69	599.5	627.5	919	450	35
DeQueen	Rolling Fork	TD	AR	77	437.0	473.5	35	101	36
Gillham	Cossatot	TD	AR	76	502.0	569.0	33	189	36
Dierks	Saline R	TD	AR	76	526.0	557.5	30	67	37
Millwood	Little R	TD	AR	66	259.2	287.0	207	1653	37
Wright Patman	Sulphur River	FWD	TX	56	220.0	259.5	143	2509	38
Lake O the Pines	Cypress Creek	FWD	TX	60	228.5	249.5	251	580	38

NECHES RIVER BASIN

Sam Rayburn	Angelina R	FWD	TX	65	164.4	173.0	2898	1009	39
B A Steinhagen	Neches R	FWD	TX	51	81.0	83.0	70	24	39

TRINITY RIVER BASIN

Benbrook	Clear Fork	FWD	TX	52	694.0	724.0	88	170	40
Lewisville	Elm Fork	FWD	TX	54	515.0	532.0	465	525	40
Grapevine	Denton Cr	FWD	TX	52	535.0	560.0	189	248	41
Lavon	East Fork	FWD	TX	77	492.0	503.5	457	277	41
Navarro Mills	Richland Cr	FWD	TX	68	424.5	443.0	63	149	42
Bardwell	Waxahachie Cr	FWD	TX	65	421.0	439.0	55	85	42

SAN JACINTO RIVER BASIN

Barker	Buffalo Bayou	GD	TX	45	-	107.0	0	207	43
Addicks	Buffalo Bayou	GD	TX	48	-	114.0	0	205	43

BRAZOS RIVER BASIN

Whitney	Brazos	FWD	TX	51	533.0	571.0	627	1372	44
Waco	Bosque	FWD	TX	65	455.0	500.0	153	574	44
Proctor	Leon R	FWD	TX	63	1162.0	1197.0	59	315	45
Belton	Leon R	FWD	TX	54	594.0	631.0	458	640	45
Stillhouse H	Lampasas R	FWD	TX	68	622.0	666.0	236	395	46
North Fork	N F San Gabriel	FWD	TX	79	791.0	834.0	37	93	46
Granger	San Gabriel R	FWD	TX	79	504.0	528.0	66	179	47
Somerville	Yegua Cr	FWD	TX	67	238.0	258.0	160	347	47

COLORADO RIVER BASIN

Twin Buttes	S&M Concho R	FWD*	TX	63	1940.2	1969.1	186	454	48
O C Fisher	N Concho R	FWD	TX	52	1908.0	1938.5	119	277	48
Hords Cr	Hords Cr	FWD	TX	48	1900.0	1920.0	9	17	49
Marshall Ford	Colorado R	FWD*	TX	40	681.0	714.0	1172	780	49

GUADALUPE RIVER BASIN

Canyon	Guadalupe R	FWD	TX	64	909.0	943.0	386	355	50

RIO GRANDE BASIN

Platoro	Conejos R	AD*	CO	51	10027.5	10034.0	54	6	51
Abiquiu	Rio Chama	AD	NM	63	-	6283.5	0	568	51
Cochiti	Rio Grande	AD	NM	75	5321.45	5460.5	47	539	52
Galisteo	Galisteo Cr	AD	NM	70	-	5608.0	0	90	52
Jemez Canyon	Jemez R	AD	NM	53	5160.0	5232.0	2	104	53
Los Esteros	Pecos R	AD	NM	80	4776.5	4797.0	267	182	53
Sumner	Pecos R	AD*	NM	37	4261.0	4282.0	47	86	54
Two Rivers	Rio Hondo	AD	NM	63	-	4032.0	0	168	54

ALPHABETICAL INDEX

SUMMARY OF LAKE CONDITIONS FOR WATER YEAR 1980

WHITE RIVER BASIN

BEAVER LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Inflows (1,000 AC. FT.)													
Avg 1968 thru 1980	50.5	115.7	107.5	79.3	101.4	204.3	172.7	124.9	78.8	26.3	11.2	35.4	1,108.0
WY 1980	0.1	18.0	13.2	13.5	22.7	88.8	58.9	74.4	37.6	0.7	0.4	1.1	329.3
Releases (1,000 AC. FT.)													
Avg 1968 thru 1980	32.0	63.1	75.9	93.8	91.8	86.4	112.4	107.3	88.3	90.1	93.0	56.5	990.6
WY 1980	6.4	1.6	2.9	23.9	90.0	35.9	5.1	6.2	28.3	64.8	8.3	21.3	294.7
Basin Rainfall (inches)													
Avg 1968 thru 1980	4.1	3.7	3.1	1.9	2.0	4.2	4.0	4.3	4.0	2.7	2.4	4.2	40.6
WY 1980	2.1	2.7	1.1	0.8	0.8	3.4	1.1	2.9	3.0	0.3	0.5	2.0	20.7
Deviation	-2.0	-1.0	-2.0	-1.1	-1.2	-0.8	-2.9	-1.4	-1.0	-2.4	-1.9	-2.2	-19.9
Pool Elevation													
End of Month	1,114.10	1,114.47	1,114.61	1,114.00	1,111.10	1,112.81	1,114.43	1,116.51	1,116.31	1,113.12	1,109.07	1,107.74	
Maximum	1,114.77	1,114.59	1,114.61	1,114.80	1,111.40	1,112.81	1,114.43	1,116.51	1,116.53	1,116.31	1,113.12	1,109.07	1,116.53
Minimum	1,113.92	1,113.87	1,114.18	1,114.00	1,111.10	1,110.23	1,112.81	1,114.43	1,115.86	1,113.12	1,109.07	1,107.72	1,107.72
Pool Content EOM (1,000 AC. FT.)	1,491.2	1,501.0	1,504.7	1,488.5	1,413.9	1,457.7	1,499.9	1,555.6	1,550.1	1,465.7	1,363.2	1,330.7	

TABLE ROCK LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Inflows (1,000 AC. FT.)													
Avg 1961 thru 1980	101.9	225.2	217.7	210.5	207.0	379.0	406.9	388.6	219.0	139.9	108.4	105.7	2,709.8
WY 1980	22.9	96.9	43.7	64.8	209.6	287.5	182.3	134.0	170.5	78.5	88.3	24.7	1,403.7
Releases (1,000 AC. FT.)													
Avg 1961 thru 1980	123.0	193.2	219.9	225.6	205.4	267.1	312.9	348.2	214.6	218.9	167.3	126.8	2,622.9
WY 1980	77.5	122.8	174.5	67.6	80.3	140.1	146.8	140.9	248.7	268.8	159.1	97.7	1,724.0
Basin Rainfall (inches)													
Avg 1961 thru 1980	3.4	3.4	2.8	1.8	2.0	3.7	4.2	4.5	4.3	3.0	3.1	4.3	40.5
WY 1980	2.4	3.8	1.3	0.9	1.4	3.9	1.8	3.6	4.4	0.4	1.3	2.2	27.4
Deviation	-1.0	+0.4	-1.5	-0.9	-0.6	+0.2	-2.4	-0.9	+0.1	-2.6	-1.8	-2.1	-13.1
Pool Elevation													
End of Month	910.39	909.49	905.93	905.66	908.72	912.03	912.48	911.89	909.47	903.87	901.23	898.71	
Maximum	912.11	910.39	909.51	905.96	908.87	912.03	913.39	912.61	911.91	909.47	903.87	901.30	913.39
Minimum	910.39	908.74	905.73	905.18	905.62	907.28	912.01	911.34	909.47	903.87	901.23	898.71	898.71
Pool Content EOM (1,000 AC. FT.)	2,509.0	2,472.6	2,332.3	2,322.1	2,441.8	2,576.3	2,595.2	2,570.5	2,471.8	2,254.3	2,158.3	2,068.9	

SUMMARY OF LAKE CONDITIONS FOR WATER YEAR 1980

WHITE RIVER BASIN

BULL SHOALS LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Inflows (1,000 AC. FT.)													
Avg 1953 thru 1980	145.0	259.8	288.4	273.6	307.7	490.4	527.7	604.9	350.5	398.3	197.0	165.0	4,000.0
WY 1980	92.9	230.9	220.7	97.5	184.4	330.5	285.3	218.2	336.3	292.8	176.7	111.0	2,577.2
Releases (1,000 AC. FT.)													
Avg 1953 thru 1980	226.8	199.9	245.8	305.0	270.7	304.6	375.3	416.4	320.3	404.6	349.7	254.9	3,469.9
WY 1980	498.6	223.2	138.5	121.5	115.4	224.1	153.1	316.9	277.0	361.0	143.7	98.3	2,626.0
Basin Rainfall (inches)													
Avg 1953 thru 1980	3.0	3.3	2.6	1.7	2.1	3.5	4.2	4.9	4.2	3.5	2.8	3.9	39.7
WY 1980	2.2	4.0	1.3	0.9	1.4	3.7	1.7	3.3	4.3	0.6	1.3	2.2	26.9
Deviation	-0.8	+0.7	-1.3	-0.8	-0.7	+0.2	-2.5	-1.6	+0.1	-2.9	-1.5	-1.7	-12.8
Pool Elevation													
End of Month	647.20	646.89	648.53	647.67	648.94	650.96	653.43	650.68	651.43	649.03	649.01	648.76	
Maximum	656.78	647.20	648.59	648.65	648.94	650.96	653.79	653.45	651.48	651.52	649.29	649.20	656.78
Minimum	647.20	645.76	646.80	647.67	647.26	648.17	650.96	650.68	649.43	648.98	648.82	648.71	645.76
Pool Content EOM (1,000 AC. FT.)	2,750.4	2,737.4	2,806.8	2,770.1	2,824.4	2,912.2	3,022.4	2,899.9	2,932.9	2,828.3	2,827.4	2,816.7	

NORFORK LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Inflows (1,000 AC. FT.)													
Avg 1946 thru 1980	48.6	87.9	99.3	122.3	126.6	185.9	196.8	196.8	105.8	78.1	48.9	47.3	1,342.3
WY 1980	44.5	99.6	112.7	64.0	101.8	146.8	154.3	104.8	89.3	42.3	31.3	32.9	1,024.3
Releases (1,000 AC. FT.)													
Avg 1946 thru 1980	69.9	70.7	91.6	120.8	117.9	55.4	130.7	64.2	110.5	121.7	112.4	87.2	1,153.0
WY 1980	110.4	45.5	77.2	183.6	117.3	79.1	43.4	49.9	116.7	94.7	116.2	62.4	1,096.0
Basin Rainfall (inches)													
Avg 1946 thru 1980	2.8	3.6	2.9	2.5	2.7	3.7	4.2	4.9	4.0	3.7	3.0	3.4	41.4
WY 1980	2.9	3.6	3.2	1.0	1.8	3.4	2.1	2.9	3.0	1.0	0.5	2.2	27.6
Deviation	+0.1	0.0	+0.3	-1.5	-0.9	-0.3	-2.1	-2.0	-1.0	-2.7	-2.5	-1.2	-13.8
Pool Elevation													
End of Month	547.27	549.41	550.75	544.65	543.5	546.33	551.04	552.96	551.06	547.73	542.66	540.49	
Maximum	550.84	549.41	550.87	550.75	544.66	546.33	551.35	552.96	553.12	551.07	547.75	542.67	553.12
Minimum	546.82	546.66	549.33	544.65	542.46	541.30	546.33	551.04	551.06	547.73	542.66	540.36	540.36
Pool Content EOM (1,000 AC. FT.)	1,150.1	1,195.1	1,223.9	1,096.9	1,073.3	1,130.9	1,230.1	1,272.3	1,230.5	1,159.8	1,057.5	1,015.9	

SUMMARY OF LAKE CONDITIONS FOR WATER YEAR 1980

WHITE RIVER BASIN

CLEARWATER LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Inflows (1,000 AC. FT.)													
Avg 1949 thru 1980	20.2	39.9	49.5	55.2	54.7	93.3	93.3	76.0	34.2	26.5	16.3	19.9	579.0
WY 1980	11.6	28.3	45.4	26.0	45.8	55.2	56.2	30.4	17.0	8.9	12.5	13.6	350.9
Releases (1,000 AC. FT.)													
Avg 1949 thru 1980	20.6	32.7	49.5	49.6	57.3	78.8	90.6	76.4	48.1	32.1	26.3	24.6	586.6
WY 1980	11.8	25.4	48.1	25.8	45.3	48.6	62.0	22.7	17.9	9.3	11.6	11.1	339.6
Basin Rainfall (inches)													
Avg 1949 thru 1980	2.6	3.6	3.2	2.6	2.7	4.1	4.3	4.6	3.6	3.7	3.5	3.5	42.0
WY 1980	2.0	5.4	2.9	1.1	2.1	3.7	2.2	2.8	1.0	1.1	3.8	3.7	31.8
Deviation	-0.6	+1.8	-0.3	-1.5	-0.6	-0.4	-2.1	-1.8	-2.6	-2.6	+0.3	+0.2	-10.2
Pool Elevation													
End of Month	494.11	495.73	494.03	494.07	494.20	497.81	494.22	498.30	497.43	496.62	496.58	497.63	
Maximum	494.41	496.28	500.21	494.28	499.58	497.81	497.97	498.66	498.52	497.47	497.53	497.63	500.21
Minimum	493.61	494.10	493.98	493.85	493.83	493.91	493.97	494.22	497.41	496.62	496.52	496.38	493.61
Pool Content EOM (1,000 AC. FT.)	22.1	24.8	22.0	22.0	22.3	28.5	22.3	29.4	27.8	26.4	26.3	28.2	

GREERS FERRY LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Inflows (1,000 AC. FT.)													
Avg 1965 thru 1980	37.6	104.6	165.3	126.6	137.6	252.4	221.7	155.6	62.2	11.9	8.4	35.9	1,319.8
WY 1980	4.2	32.7	119.6	42.3	59.7	126.7	171.3	128.0	22.6	0.1	0.1	7.8	715.1
Releases (1,000 AC. FT.)													
Avg 1965 thru 1980	44.1	52.3	86.9	143.9	120.9	125.3	130.9	134.6	92.3	113.3	101.9	57.6	1,204.0
WY 1980	82.9	6.3	36.1	168.1	90.2	15.4	62.9	76.3	130.1	71.0	67.0	32.9	839.2
Basin Rainfall (inches)													
Avg 1964 thru 1980	3.5	4.3	4.3	2.8	2.9	5.2	4.8	5.2	3.8	3.6	3.2	5.3	48.9
WY 1980	3.1	3.0	3.1	1.6	1.1	3.9	3.3	5.2	3.0	0.4	1.0	5.5	34.2
Deviation	-0.4	-1.3	-1.2	-1.2	-1.8	-1.3	-1.5	0.0	-0.8	-3.2	-2.2	+0.2	-14.7
Pool Elevation													
End of Month	456.83	457.47	459.97	455.67	453.82	457.23	460.36	461.59	457.65	454.56	451.46	450.13	
Maximum	459.76	457.47	459.99	459.97	455.67	457.28	461.22	462.15	461.62	457.65	454.56	451.46	462.15
Minimum	456.59	456.76	457.20	455.67	453.80	453.78	457.23	459.78	457.65	454.56	451.46	449.99	449.99
Pool Content EOM (1,000 AC. FT.)	1,781.9	1,801.1	1,878.1	1,747.1	1,691.8	1,793.9	1,890.3	1,929.1	1,806.5	1,713.8	1,623.9	1,586.6	

ARKANSAS RIVER BASIN

PUEBLO DAM	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
In flow (1000 Ac. Ft.)													
Avg 1894 thru 1980	22.0	22.6	21.3	20.0	16.5	15.7	24.0	67.8	131.1	88.5	57.2	26.2	512.9
FY 1980	14.1	27.4	24.0	20.5	18.3	26.6	41.4	164.0	266.1	109.6	43.5	30.7	786.2
Releases (1000 Ac. Ft.)													
Avg 1966 thru 1980	7.5	7.1	4.8	4.3	3.8	12.5	20.0	29.2	65.3	44.2	25.5	10.2	234.4
FY 1980	25.9	23.0	3.8	3.7	6.7	19.7	43.0	160.5	266.4	121.3	80.6	30.7	785.3
Rainfall (Inches)													
Avg 1938 thru 1980	.77	.44	.46	.33	.42	.71	1.36	1.76	1.30	1.95	1.79	.80	12.09
FY 1980	.55	.86	.75	.17	.09	.72	4.18	4.05	.43	.70	.61	.59	13.7
Pool Elevation (EOM)	4799.77	4802.85	4815.01	4823.34	4828.43	4831.26	4830.60	4831.99	4831.87	4826.69	4800.40	4799.96	
Maximum	4807.52	4802.85	4815.01	4823.34	4828.43	4831.26	4832.83	4835.60	4835.05	4832.98	4826.23	4801.64	4835.60
Minimum	4799.75	4799.48	4803.52	4815.26	4823.58	4828.58	4830.52	4830.13	4831.87	4826.69	4800.40	4799.96	4799.48
Pool Content (EOM) (1000 Ac. Ft.)	34.4	38.8	59.0	75.8	87.4	94.3	92.7	96.1	95.8	82.3	35.3	34.7	826.6

TRINIDAD LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Inflow (1000 Ac. Ft.)													
Avg 1894 thru 1980	1.3	1.4	1.1	.8	.7	.8	2.1	14.8	1.6	10.1	4.5	1.7	53.9
FY 1980	1.5	1.4	1.2	1.1	.8	.8	4.3	29.9	25.0	9.3	4.6	2.3	82.4
Releases (1000 Ac. Ft)													
Avg 1966 thru 1980	1.2	.7	.5	.5	.6	.5	.7	3.8	11.7	11.7	7.2	2.8	41.9
FY 1980	1.3	.3	.09	.09	.3	0	.1	1.6	20.7	15.4	12.1	4.4	56.4
Rainfall (Inches)													
Avg 1938 thru 1980	1.03	.89	.60	1.04	1.15	1.11	.71	3.30	1.80	1.32	2.62	1.29	15.86
FY 1980	1.35	1.34	.54	.82	.19	1.09	4.12	4.33	.13	.24	1.65	2.12	17.92
Pool Elevation (EOM)	6179.35	6181.17	6182.81	6184.29	6185.14	6186.11	6191.57	6219.40	6222.32	6216.78	6209.57	6207.04	
Maximum	6179.35	6181.17	6182.81	6184.29	6185.14	6186.11	6191.57	6219.40	6222.45	6222.34	6216.57	6209.31	6222.45
Minimum	6178.21	6179.43	6181.17	6182.68	6184.35	6185.19	6186.11	6193.36	6119.62	6216.78	6209.57	6207.04	6178.21
Pool Content (EOM) (1000 Ac. Ft.)	18.3	19.4	20.4	21.4	21.9	22.6	26.5	54.3	58.0	51.0	42.9	40.2	396.9

ARKANSAS RIVER BASIN

JOHN MARTIN RES.	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Inflows (1000 Ac. Ft.)													
Avg 1943 thru 1980	6.7	6.1	6.3	7.5	6.8	6.9	7.1	14.9	47.4	36.4	27.3	8.3	181.7
FY 1980	2.8	5.1	6.6	10.1	8.8	7.0	15.9	134.0	79.3	16.7	11.2	11.3	308.8
Releases (1000 Ac. Ft.)													
Avg 1961 thru 1980	13.0	6.2	4.6	4.3	3.8	3.5	23.6	32.8	48.0	40.3	42.6	19.9	242.6
FY 1980	1.4	.8	.1	0	0	0	7.8	13.8	70.7	91.4	44.9	17.5	248.4
Rainfall (Inches)													
Avg 1943 thru 1980	.73	.42	.23	.24	.20	.56	1.01	2.11	1.50	1.88	1.83	.79	11.50
FY 1980	.81	.29	.82	.09	.06	3.05	3.76	2.22	.53	.75	.77	.92	14.07
Pool Elevation (EOM	3789.73	3792.70	3796.21	3800.64	3803.70	3805.88	3807.95	3831.06	3831.62	3818.32	3809.47	3807.23	
Maximum	3789.73	3792.70	3796.21	3800.64	3803.70	3805.88	3807.95	3831.06	3832.79	3831.32	3817.72	3809.41	3832.79
Minimum	3788.65	3789.87	3792.78	3796.28	3800.74	3803.77	3805.96	3808.37	3830.55	3818.32	3809.47	3807.23	3788.65
Pool Content (EOM) (1000 Ac. Ft.)	5.0	9.2	15.7	25.8	34.6	41.5	48.6	165.7	170.0	90.4	53.9	50.3	710.7

CHENEY RESERVOIR.	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS(1000AC.FT.)													
AVG 1938 THRU 1961	8.54	6.26	5.85	5.76	7.98	11.14	13.63	22.35	20.15	11.91	5.46	7.54	126.6
FY 1980	99.98	47.52	15.67	15.40	20.51	39.47	26.57	16.11	6.59	2.32	9.59	.49	300.2
RELEASES(1000AC.FT.)													
AVG 1976 THRU 1980	1.74	24.12	4.25	5.01	5.02	11.11	13.83	20.58	12.76	.60	2.54	0.00	101.5
FY 1980	1.32	110.95	21.24	19.16	17.59	18.73	41.82	11.00	3.57	0.00	0.00	0.00	245.4
RAINFALL(INCHES)													
AVG 1930 THRU 1977	2.12	1.30	.90	.66	.92	1.54	2.50	3.60	4.10	3.14	2.97	3.09	26.84
FY 1980	5.85	.75	.58	.94	.37	3.02	.40	2.03	1.16	.98	4.42	.21	20.71
DEVIATION	3.75	-.55	-.32	.28	-.55	1.48	-2.10	-1.57	-2.94	-2.16	1.45	-2.88	-6.11
POOL ELEVATION													
END OF MONTH	1429.03	1422.97	1422.14	1421.65	1421.76	1423.63	1421.82	1421.92	1421.37	1420.13	1420.21	1419.45	
MAXIMUM	1429.03	1427.20	1422.97	1422.44	1422.06	1423.63	1423.78	1422.12	1421.92	1421.37	1420.44	1420.21	
MINIMUM	1419.96	1422.97	1421.56	1421.55	1421.60	1421.51	1421.79	1421.53	1421.37	1420.13	1419.82	1419.42	
POOL CONTENT-EOM (1000AC.FT)	248.31	180.44	172.25	167.55	168.59	187.17	169.16	170.11	164.89	153.41	184.14	147.38	

ARKANSAS RIVER BASIN

ELDORADO LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS(1000AC.FT.)													
AVG 1922 THRU 1978	5.00	4.40	2.80	2.70	2.80	6.20	10.20	11.80	14.40	7.40	3.40	5.50	76.6
FY 1980	1.17	3.14	2.89	4.39	6.02	18.43	17.77	5.49	2.73	1.97	1.20	.02	65.2
RELEASES(1000AC.FT.)													
	RESERVOIR OPERATED AS DETENTION BASIN ONLY. IMPOUNDMENT SCHEDULED TO BEGIN MAY 1981.												
RAINFALL(INCHES)													
AVG 1930 THRU 1977	2.45	1.66	1.12	.85	.98	1.87	2.97	4.40	4.74	3.71	3.19	3.92	31.86
FY 1980	1.32	.88	.20	.02	.15	1.32	.46	.85	.82	.48	3.36	.49	10.35
DEVIATION	-1.13	-.78	-.92	-.83	-.83	-.55	-2.51	-3.55	-3.92	-3.23	.17	-3.43	-21.51
POOL ELEVATION													
END OF MONTH	1279.40	1280.00	1279.90	1280.40	1281.40	1295.30	1281.30	1280.10	1279.80	1279.50	1279.00	1279.40	
MAXIMUM	1280.30	1283.00	1280.70	1283.20	1286.40	1297.00	1295.30	1282.00	1280.20	1280.00	1279.70	1279.40	
MINIMUM	1276.10	1279.20	1279.80	1279.80	1280.10	1280.30	1281.30	1280.10	1279.60	1279.40	1279.00	1279.00	
POOL CONTENT-EOM (1000AC.FT)	.27	.30	.29	.32	.38	2.63	.37	.30	.29	.27	.25	.27	

ARKANSAS RIVER BASIN

KAW LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS(1000AC.FT.)													
AVG 1922 THRU 1974	172.70	119.30	88.10	86.70	92.60	164.30	253.70	301.10	335.90	246.10	140.50	145.90	2146.9
FY 1980	41.36	550.78	109.98	111.03	138.25	252.79	549.72	137.85	79.64	22.51	52.81	18.84	2065.6
RELEASES(1000AC.FT.)													
AVG 1977 THRU 1980	51.21	211.29	72.82	53.78	95.44	245.24	277.00	212.00	304.10	180.01	48.59	152.69	1904.2
FY 1980	20.98	481.47	174.77	110.96	133.76	173.04	591.51	167.27	58.78	26.13	38.51	10.64	1987.8
RAINFALL(INCHES)													
AVG 1930 THRU 1977	2.40	1.64	1.12	.84	1.02	1.80	2.92	4.31	4.58	3.60	3.20	3.70	31.05
FY 1980	3.40	2.10	.50	.71	.38	2.02	.86	1.35	1.71	.46	4.40	.93	18.82
DEVIATION	1.00	.46	-.62	-.13	-.64	.22	-2.06	-2.96	-2.79	-3.14	1.20	-2.77	-12.23
POOL ELEVATION													
END OF MONTH	1010.14	1014.03	1010.30	1010.24	1010.49	1014.97	1012.34	1010.28	1010.90	1009.85	1009.91	1009.75	
MAXIMUM	1010.30	1017.10	1014.03	1011.15	1011.36	1014.97	1020.28	1012.34	1011.06	1010.90	1011.17	1009.95	
MINIMUM	1008.97	1010.14	1010.06	1009.91	1009.81	1009.52	1011.60	1010.11	1010.80	1009.83	1009.62	1009.69	
POOL CONTENT-EOM (1000AC.FT)	431.02	501.28	433.79	432.75	437.08	519.42	469.92	433.44	444.17	426.88	427.89	424.48	

ARKANSAS RIVER BASIN

GREAT SALT PLAINS LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS(1000AC.FT.)													
AVG 1923 THRU 1963	22.59	11.25	8.29	8.80	13.22	14.98	27.30	59.79	48.45	25.40	24.35	19.16	283.6
FY 1980	14.54	73.31	13.19	17.09	15.64	25.64	61.62	46.46	77.50	5.87	3.97	.55	355.4
RELEASES(1000AC.FT.)													
AVG 1976 THRU 1980	2.12	17.00	5.65	6.65	8.23	23.31	23.80	55.16	41.58	8.89	4.79	8.38	205.6
FY 1980	1.17	72.48	13.08	16.68	16.34	19.75	50.94	50.11	63.62	12.33	.37	.36	317.2
RAINFALL(INCHES)													
AVG 1930 THRU 1977	1.87	1.19	.85	.66	.91	1.45	2.37	3.61	3.59	2.53	2.96	2.46	24.45
FY 1980	3.08	.89	.03	.49	.27	.64	1.28	1.79	3.70	.60	2.11	.36	15.24
DEVIATION	1.21	-.30	-.82	-.17	-.64	-.81	-1.09	-1.82	.11	-1.93	-.85	-2.10	-9.21
POOL ELEVATION													
END OF MONTH	1125.59	1125.52	1125.45	1125.45	1125.35	1125.74	1126.50	1125.65	1126.33	1124.71	1124.30	1123.75	
MAXIMUM	1125.59	1127.67	1125.52	1125.63	1125.51	1125.86	1126.69	1126.50	1127.76	1126.33	1124.71	1124.30	
MINIMUM	1123.96	1125.52	1125.25	1125.28	1125.35	1125.33	1125.47	1125.42	1125.13	1124.71	1124.15	1123.63	
POOL CONTENT-EOM (1000AC.FT)	36.89	36.24	35.59	35.59	34.67	38.29	45.94	37.45	44.16	29.06	25.72	21.48	

ARKANSAS RIVER BASIN

KEYSTONE LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS(1000AC.FT.)													
AVG 1923 THRU 1970	398.60	345.60	172.30	157.00	178.00	259.20	539.30	776.40	789.90	511.30	307.50	339.60	4674.7
FY 1980	33.82	889.53	255.67	192.20	216.60	316.07	1153.59	935.90	837.62	89.26	85.39	19.94	5024.6
RELEASES(1000AC.FT.)													
AVG 1976 THRU 1980	90.84	238.07	122.96	97.21	109.48	266.02	407.14	576.06	606.51	383.17	187.33	231.59	3316.4
FY 1980	57.75	750.65	334.33	223.85	202.23	286.88	893.26	1041.29	736.77	337.46	63.98	89.59	5018.1
RAINFALL(INCHES)													
AVG 1930 THRU 1977	2.42	1.68	1.18	.95	1.11	1.81	2.90	4.37	4.18	3.20	3.03	3.50	30.33
FY 1980	1.37	2.91	.41	.89	.35	1.28	2.71	4.15	4.61	.08	1.85	2.02	22.63
DEVIATION	-1.05	1.23	-.77	-.06	-.76	-.53	-.19	-.22	.43	-3.12	-1.18	-1.48	-7.70
POOL ELEVATION													
END OF MONTH	720.29	725.94	722.89	721.09	721.66	722.68	731.28	727.51	730.34	720.70	720.86	717.33	
MAXIMUM	721.65	727.33	725.94	722.95	721.83	722.97	732.32	731.28	732.65	730.34	721.03	720.86	
MINIMUM	720.29	719.16	722.75	721.09	719.19	719.38	722.67	723.97	723.75	720.70	719.61	717.25	
POOL CONTENT-EOM (1000AC.FT)	550.77	698.41	615.18	569.83	583.97	609.81	842.59	744.35	822.53	560.49	564.28	484.40	

ARKANSAS RIVER BASIN

HEYBURN LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS(1000AC.FT.)													
AVG 1929 THRU 1955	2.31	2.25	1.36	1.16	1.99	2.56	5.91	8.78	6.18	2.00	1.53	4.54	40.6
FY 1980	.13	1.76	.09	.55	.34	1.49	3.04	8.07	7.83	.06	.10	.16	23.6
RELEASES(1000AC.FT.)													
AVG 1976 THRU 1980	.10	.15	.03	.08	.37	1.14	2.73	9.98	5.07	.62	.06	.74	21.1
FY 1980	0.00	.73	.06	.29	.31	.84	2.23	7.98	7.35	.09	.08	0.00	20.0
RAINFALL(INCHES)													
AVG 1930 THRU 1977	2.94	2.25	1.51	1.40	1.54	2.32	3.53	4.88	4.28	3.22	3.05	3.71	34.63
FY 1980	1.39	2.90	.26	1.52	.98	2.56	3.21	5.07	5.17	.35	1.53	2.91	27.85
DEVIATION	-1.55	.65	-1.25	.12	-.56	.24	-.32	.19	.89	-2.87	-1.52	-.80	-6.78
POOL ELEVATION													
END OF MONTH	760.77	761.66	761.44	761.61	761.57	761.88	762.23	762.00	761.73	760.70	759.75	759.35	
MAXIMUM	761.16	762.42	761.66	761.85	761.78	762.34	763.26	763.69	764.59	761.73	760.70	759.89	
MINIMUM	760.72	760.58	761.43	761.36	761.56	761.45	761.53	761.80	761.45	760.70	759.75	759.31	
POOL CONTENT-EOM													
(1000AC.FT)	6.01	6.78	6.58	6.74	6.70	6.98	7.33	7.09	6.85	5.95	5.25	4.98	

ARKANSAS RIVER BASIN

TORONTO LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS(1000AC.FT.)													
AVG 1922 THRU 1964	22.47	16.27	9.84	10.87	11.06	27.08	48.51	43.84	47.62	37.14	9.37	22.73	306.8
FY 1980	1.16	22.81	3.07	4.38	26.31	106.74	41.83	4.30	.70	.07	.85	.06	212.3
RELEASES(1000AC.FT.)													
AVG 1976 THRU 1980	5.02	18.65	5.04	1.59	11.26	27.90	37.29	23.89	37.69	25.69	6.75	5.19	206.0
FY 1980	1.29	13.54	12.39	4.11	26.46	44.63	103.26	3.29	.89	1.39	1.00	.33	212.6
RAINFALL(INCHES)													
AVG 1930 THRU 1977	2.75	2.00	1.32	1.04	1.06	2.35	3.35	4.73	5.10	3.96	3.38	4.45	35.49
FY 1980	3.01	3.48	.21	.59	.79	4.29	.61	1.11	1.35	.56	4.11	1.05	21.16
DEVIATION	.26	1.48	-1.11	-.45	-.27	1.94	-2.74	-3.62	-3.75	-3.40	.73	-3.40	-14.33
POOL ELEVATION													
END OF MONTH	901.46	904.95	901.78	901.98	901.82	916.44	901.48	901.43	900.76	899.20	898.45	897.77	
MAXIMUM	901.84	907.73	904.95	902.36	904.40	916.44	916.73	901.71	901.43	900.76	899.20	898.45	
MINIMUM	901.29	901.35	901.78	901.50	901.48	901.52	901.47	901.43	900.76	899.20	898.45	897.77	
POOL CONTENT-EOM													
(1000AC.FT)	21.78	32.29	22.63	23.16	22.73	84.77	21.84	21.70	19.94	16.10	14.38	12.95	

ARKANSAS RIVER BASIN

FALL RIVER LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS(1000AC.FT.)													
AVG 1922 THRU 1964	15.86	12.40	7.05	7.98	8.39	19.49	36.98	35.80	33.96	20.12	6.66	14.31	219.0
FY 1980	.92	7.58	2.65	3.94	14.37	68.39	29.75	6.84	1.38	.83	.72	.25	137.6
RELEASES(1000AC.FT.)													
AVG 1976 THRU 1980	3.02	12.15	3.15	1.92	7.16	20.12	27.34	33.35	35.55	39.90	5.51	5.46	194.6
FY 1980	.61	4.79	3.98	4.27	15.12	30.16	63.91	6.09	1.71	1.28	.55	.36	132.9
RAINFALL(INCHES)													
AVG 1930 THRU 1977	2.64	1.72	1.24	.93	1.04	2.10	3.19	4.45	4.86	3.80	3.16	4.18	33.31
FY 1980	2.57	3.53	.57	.52	.89	3.11	.42	1.67	.49	.82	2.80	.59	17.98
DEVIATION	-.07	1.81	-.67	-.41	-.15	1.01	-2.77	-2.78	-4.37	-2.98	-.36	-3.59	-15.33
POOL ELEVATION													
END OF MONTH	948.52	949.31	948.60	948.40	948.02	958.86	948.52	948.47	947.64	946.04	945.34	944.59	
MAXIMUM	948.85	950.57	949.57	948.60	949.32	958.86	958.91	948.98	948.47	947.64	946.04	945.34	
MINIMUM	948.46	948.46	948.60	948.01	947.83	948.02	948.48	948.41	947.64	946.04	945.34	944.59	
POOL CONTENT-EOM (1000AC.FT)	21.97	23.89	22.16	21.69	20.79	57.31	21.97	21.85	19.96	16.61	15.27	13.88	

ARKANSAS RIVER BASIN

ELK CITY LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS(1000AC.FT.)													
AVG 1922 THRU 1964	20.42	14.25	6.99	8.31	8.20	19.04	43.80	44.17	41.67	20.30	4.83	16.95	248.9
FY 1980	.66	34.30	2.08	2.63	11.76	63.83	30.96	11.19	1.14	.06	.69	.01	159.3
RELEASES(1000AC.FT.)													
AVG 1976 THRU 1980	1.43	16.89	6.32	1.46	6.36	24.89	26.18	36.15	37.70	97.40	6.95	5.35	267.1
FY 1980	1.23	17.19	11.74	2.98	10.58	23.09	54.48	10.09	1.80	1.16	.88	.84	136.1
RAINFALL(INCHES)													
AVG 1930 THRU 1977	2.87	2.13	1.36	1.23	1.17	2.28	3.55	4.75	5.15	3.71	3.17	4.53	35.90
FY 1980	2.07	4.17	.71	.14	.44	2.83	.89	1.80	.24	.64	2.35	.81	17.09
DEVIATION	-.80	2.04	-.65	-1.09	-.73	.55	-2.66	-2.95	-4.91	-3.07	-.82	-3.72	-18.81
POOL ELEVATION													
END OF MONTH	790.21	794.85	792.22	792.04	792.33	801.13	796.16	796.12	795.47	794.40	793.70	793.00	
MAXIMUM	791.03	798.21	794.85	792.24	792.94	801.13	801.26	796.59	796.12	795.47	794.40	793.70	
MINIMUM	790.16	789.98	792.22	792.02	791.98	791.90	796.00	795.87	795.47	794.40	793.70	793.00	
POOL CONTENT-EOM (1000AC.FT)	23.22	39.85	29.80	29.16	30.19	70.82	45.48	45.30	42.48	38.02	35.26	32.59	

ARKANSAS RIVER BASIN

BIG HILL LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS(1000AC.FT.)													
AVG 1929 THRU 1978								3.14	3.60	1.73	0.27	1.33	
FY 1980								.01	.11	.06	.09	.00	
RELEASES(1000AC.FT.)	RESERVOIR OPERATED AS DETENTION BASIN ONLY. IMPOUNDMENT SCHEDULED TO BEGIN JUNE 1981												
RAINFALL(INCHES)													
AVG 1930 THRU 1977									5.67	3.81	3.36	4.90	
FY 1980									1.19	.67	2.50	1.22	
DEVIATION									-4.48	-3.14	-.86	-3.68	
POOL ELEVATION													
END OF MONTH								806.30	806.70	806.00	809.60	808.90	
MAXIMUM								806.30	806.70	806.70	810.10	809.60	
MINIMUM								0.00	806.30	805.90	805.80	808.90	
POOL CONTENT-EOM (1000AC.FT)								.01	.02	.01	.08	.06	

ARKANSAS RIVER BASIN

OOLOGAH LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS(1000AC.FT.)													
AVG 1923 THRU 1972	159.80	111.80	73.31	79.26	70.94	135.20	280.20	297.90	290.30	154.70	53.98	109.00	1816.4
FY 1980	7.57	228.76	42.55	26.68	97.94	270.35	376.66	78.15	20.11	5.57	11.21	10.38	1175.9
RELEASES(1000AC.FT.)													
AVG 1976 THRU 1980	32.50	141.84	39.03	14.55	41.38	188.42	229.43	176.24	171.80	402.11	47.95	56.01	1541.3
FY 1980	2.02	98.09	136.84	24.21	72.47	163.79	441.04	93.92	18.25	2.65	1.84	1.09	1056.2
RAINFALL(INCHES)													
AVG 1930 THRU 1977	3.21	2.30	1.54	1.45	1.32	2.51	3.74	5.07	5.28	3.69	3.31	4.79	38.21
FY 1980	2.05	4.94	.12	.35	.46	3.15	1.24	1.91	2.06	.68	2.90	1.94	21.80
DEVIATION	-1.16	2.64	-1.42	-1.10	-.86	.64	-2.50	-3.16	-3.22	-3.01	-.41	-2.85	-16.41
POOL ELEVATION													
END OF MONTH	636.97	641.17	638.00	637.89	638.77	641.75	639.28	638.42	637.77	636.78	636.09	635.77	
MAXIMUM	637.57	642.87	641.17	638.24	638.77	641.75	642.31	639.28	638.42	637.79	636.78	636.31	
MINIMUM	636.86	636.86	637.81	637.86	637.87	637.93	638.70	637.97	637.77	636.78	636.09	635.77	
POOL CONTENT-EOM (1000AC.FT)	523.82	651.51	553.42	550.26	576.58	670.42	592.08	566.05	546.81	518.43	498.84	490.10	

ARKANSAS RIVER BASIN

HULAH LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS(1000AC.FT.)													
AVG 1918 THRU 1965	32.89	19.51	8.17	7.00	6.95	17.26	41.27	48.09	38.39	34.39	15.25	32.09	301.3
FY 1980	1.23	91.35	3.75	2.53	10.96	54.20	68.53	15.97	2.01	.11	.47	.44	251.5
RELEASES(1000AC.FT.)													
AVG 1976 THRU 1980	5.64	24.61	11.81	1.88	8.72	17.45	29.10	43.07	36.23	41.93	11.46	4.26	236.1
FY 1980	2.15	37.80	47.67	1.66	11.38	14.87	73.56	44.11	1.34	1.04	1.13	.66	237.4
RAINFALL(INCHES)													
AVG 1930 THRU 1977	2.97	2.10	1.40	1.23	1.20	2.19	3.50	4.77	4.72	3.45	3.35	4.21	35.09
FY 1980	.82	6.22	.34	.19	.59	1.80	1.75	1.13	2.07	.30	1.82	2.15	19.18
DEVIATION	-2.15	4.12	-1.06	-1.04	-.61	-.39	-1.75	-3.64	-2.65	-3.15	-1.53	-2.06	-15.91
POOL ELEVATION													
END OF MONTH	730.41	742.69	733.03	733.09	732.90	741.20	739.91	732.96	732.48	731.15	730.03	729.30	
MAXIMUM	731.32	747.70	742.69	733.09	733.68	741.20	741.45	739.91	732.98	732.48	731.15	730.04	
MINIMUM	730.33	730.02	733.03	732.87	732.84	732.79	733.02	732.87	732.48	731.15	730.03	729.30	
POOL CONTENT-EOM													
(1000AC.FT)	22.64	76.34	31.23	31.45	30.77	67.78	60.91	30.98	29.32	24.91	21.49	19.45	

ARKANSAS RIVER BASIN

COPAN LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS(1000AC.FT.)													
AVG 1936 THRU 1977										17.26	4.40	11.59	
FY 1980										.07	.07	.10	
RELEASES(1000AC.FT.)													

RESERVOIR OPERATED AS DETENTION BASIN ONLY. IMPOUNDMENT SCHEDULED TO BEGIN JUNE 1982.

COPAN LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
RAINFALL(INCHES)													
AVG 1930 THRU 1977										3.46	3.16	4.00	
FY 1980										.76	.65	2.80	
DEVIATION										-2.70	-2.51	-1.20	
POOL ELEVATION													
END OF MONTH										676.97	676.70	679.22	
MAXIMUM										676.97	676.97	679.22	
MINIMUM										0.00	676.45	676.70	
POOL CONTENT-EOM													
(1000AC.FT)										.07	.06	.13	

ARKANSAS RIVER BASIN

BIRCH LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS(1000AC.FT.)													
AVG 1936 THRU 1972	2.37	.97	.80	.62	.64	1.90	3.03	5.34	3.04	1.88	.84	1.96	23.4
FY 1980	.18	1.40	.08	.39	.91	3.32	6.10	3.39	2.21	.05	1.13	.19	19.3
RELEASES(1000AC.FT.)													
AVG 1979 THRU 1980	.25	.23	.19	.23	.22	1.13	2.54	4.09	2.31	1.09	.30	.26	12.9
FY 1980	.25	.24	.25	.24	.23	1.21	3.82	5.91	1.78	.32	.31	.30	14.9
RAINFALL(INCHES)													
AVG 1930 THRU 1977	2.85	2.08	1.45	1.24	1.31	2.37	3.28	5.01	4.52	3.23	3.31	4.42	35.07
FY 1980	.74	1.74	.06	.61	.20	1.35	1.63	2.23	4.89	0.00	3.25	2.09	18.79
DEVIATION	-2.11	-.34	-1.39	-.63	-1.11	-1.02	-1.65	-2.78	.37	-3.23	-.06	-2.33	-16.28
POOL ELEVATION													
END OF MONTH	749.00	749.81	749.48	749.60	750.15	751.77	753.07	750.55	750.28	749.15	749.32	748.79	
MAXIMUM	749.58	749.94	749.81	749.68	750.23	751.86	754.29	753.07	751.75	750.28	749.47	749.48	
MINIMUM	748.94	748.64	749.48	749.29	749.52	750.04	750.02	750.29	750.15	749.15	748.65	749.79	
POOL CONTENT-EOM (1000AC.FT)	17.51	18.41	18.04	18.17	18.79	20.65	22.21	19.24	18.94	17.68	17.86	17.28	

ARKANSAS RIVER BASIN

SKIATOOK UNDER CONSTRUCTION

ARKANSAS RIVER BASIN

NEWT GRAHAM LOCK AND DAM	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS(1000AC.FT.)													
AVG 1923 THRU 1957	306.03	159.47	104.65	137.73	123.85	203.04	501.27	562.13	549.77	233.60	99.67	137.64	3118.9
FY 1980	8.98	273.62	222.05	76.76	140.23	339.57	754.31	299.11	149.35	17.09	11.40	22.81	2315.3
RELEASES(1000AC.FT.)													
AVG 1976 THRU 1980	50.13	228.53	74.50	46.53	101.19	281.04	404.40	412.92	338.96	488.94	84.86	84.79	2596.8
FY 1980	8.94	274.34	225.67	74.97	139.46	340.47	750.51	300.10	148.27	15.76	10.75	22.02	2311.3
RAINFALL(INCHES)													
AVG 1930 THRU 1977	3.21	2.26	1.58	1.46	1.47	2.49	3.62	4.87	4.72	3.37	3.25	4.49	36.79
FY 1980	1.10	3.73	.08	.53	.47	2.12	1.95	2.39	4.01	.27	2.44	3.07	22.16
DEVIATION	-2.11	1.47	-1.50	-.93	-1.00	-.37	-1.67	-2.48	-.71	-3.10	-.81	-1.42	-14.63
POOL ELEVATION													
END OF MONTH	532.49	532.25	532.41	532.15	532.49	531.92	532.22	532.30	532.39	532.43	532.06	532.30	
MAXIMUM	532.49	532.49	532.49	532.52	532.55	532.51	532.55	532.61	532.50	532.51	532.49	532.50	
MINIMUM	532.06	531.50	531.86	532.00	532.07	531.88	531.71	531.89	531.52	532.10	532.05	532.00	
POOL CONTENT-EOM (1000AC.FT)	24.24	23.87	24.12	23.72	24.24	23.37	23.83	23.95	24.09	24.15	23.58	23.95	

ARKANSAS RIVER BASIN

CHOUTEAU LOCK AND DAM	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS(1000AC.FT.)													
AVG 1923 THRU 1957	306.03	159.47	104.65	137.73	123.85	203.31	501.22	562.13	549.77	233.60	99.67	137.64	3119.1
FY 1980	9.87	280.71	212.03	61.39	132.30	316.76	755.01	288.69	185.85	11.75	11.70	23.11	2289.2
RELEASES(1000AC.FT.)													
AVG 1976 THRU 1980	48.98	225.15	67.36	40.18	94.79	268.44	410.17	399.72	344.30	473.17	81.25	77.67	2531.2
FY 1980	9.11	280.66	208.15	59.06	129.36	316.91	754.12	286.27	184.47	9.87	9.78	20.96	2268.7
RAINFALL(INCHES)													
AVG 1930 THRU 1977	3.49	2.77	2.05	1.92	2.04	2.89	4.19	5.19	4.96	3.17	2.96	4.30	39.93
FY 1980	2.52	4.61	.56	1.32	.85	3.42	1.54	3.41	7.25	.16	1.72	5.04	32.40
DEVIATION	-.97	1.84	-1.49	-.60	-1.19	.53	-2.65	-1.78	2.29	-3.01	-1.24	.74	-7.53
POOL ELEVATION													
END OF MONTH	511.37	511.19	511.29	511.35	511.25	511.28	511.18	511.37	511.39	511.36	511.45	511.28	
MAXIMUM	511.44	511.48	511.45	511.44	511.45	511.45	511.45	511.46	511.47	511.48	511.53	511.56	
MINIMUM	511.04	510.91	511.05	511.14	511.06	511.02	511.01	511.02	511.02	511.19	511.26	511.10	
POOL CONTENT-EOM (1000AC.FT)	23.41	23.00	23.23	23.36	23.14	23.20	22.98	23.41	23.45	23.39	23.59	23.20	

ARKANSAS RIVER BASIN

COUNCIL GROVE LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS(1000AC.FT.)													
AVG 1922 THRU 1971	5.05	4.28	2.42	2.50	3.27	5.60	9.60	13.85	15.39	12.87	5.97	8.16	89.0
FY 1980	2.03	1.28	.57	.94	4.36	28.55	11.81	2.32	.38	.11	.70	.07	53.1
RELEASES(1000AC.FT.)													
AVG 1976 THRU 1980	.79	1.66	1.76	.34	1.36	6.60	8.38	4.06	10.06	19.51	.69	1.12	56.3
FY 1980	.49	.48	.18	.04	3.61	.54	25.83	.56	.30	9.44	.87	.32	42.6
RAINFALL(INCHES)													
AVG 1930 THRU 1977	2.60	1.63	1.20	.85	.92	1.91	3.17	4.72	5.05	3.88	3.55	4.00	33.48
FY 1980	2.63	1.28	.03	.31	.20	2.32	.29	.77	.77	.31	3.68	.62	13.21
DEVIATION	.03	-.35	-1.17	-.54	-.72	.41	-2.88	-3.95	-4.28	-3.57	.13	-3.38	-20.27
POOL ELEVATION													
END OF MONTH	1269.51	1269.63	1269.62	1269.78	1270.00	1278.40	1273.95	1274.12	1273.56	1269.53	1268.84	1268.09	
MAXIMUM	1269.51	1269.68	1269.65	1269.80	1270.51	1278.40	1279.75	1274.12	1274.12	1273.58	1269.53	1268.84	
MINIMUM	1268.92	1269.40	1269.58	1269.61	1269.78	1269.93	1273.95	1273.93	1273.56	1269.53	1268.75	1268.09	
POOL CONTENT-EOM (1000AC.FT)	34.94	35.28	35.25	35.70	36.31	64.07	48.34	48.90	47.10	35.00	33.08	31.05	

ARKANSAS RIVER BASIN

MARION LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS(1000AC.FT.)													
AVG 1938 THRU 1971	3.16	1.28	1.49	1.94	2.08	3.31	5.91	8.70	10.17	7.13	1.78	4.79	51.7
FY 1980	25.14	9.98	2.54	5.19	8.50	18.52	9.70	2.00	1.04	.26	3.39	.06	86.3
RELEASES(1000AC.FT.)													
AVG 1976 THRU 1980	.46	4.99	.39	.83	2.18	2.72	7.93	6.67	5.06	14.43	.81	.61	47.1
FY 1980	.87	22.62	.70	3.29	10.25	3.94	22.09	.43	.42	.48	.61	.59	66.3
RAINFALL(INCHES)													
AVG 1930 THRU 1977	2.47	1.56	1.06	.77	.97	1.76	2.81	4.51	4.80	3.90	3.28	3.84	31.73
FY 1980	7.77	1.46	1.13	1.62	.54	3.17	.59	.71	1.30	.33	6.43	.16	25.21
DEVIATION	5.30	-.10	.07	.85	-.43	1.41	-2.22	-3.80	-3.50	-3.57	3.15	-3.68	-6.52
POOL ELEVATION													
END OF MONTH	1352.66	1350.55	1350.67	1350.83	1350.55	1352.74	1350.54	1350.38	1349.81	1348.73	1348.55	1347.93	
MAXIMUM	1352.66	1352.71	1350.68	1351.01	1350.87	1352.75	1353.35	1350.56	1350.38	1349.81	1349.02	1348.55	
MINIMUM	1348.94	1350.44	1350.51	1350.42	1350.55	1350.55	1350.48	1350.32	1349.81	1348.73	1348.55	1347.93	
POOL CONTENT-EOM (1000AC.FT)	97.82	84.05	84.80	85.79	84.05	98.37	83.99	83.00	79.52	73.20	72.19	68.71	

ARKANSAS RIVER BASIN

JOHN REDMOND DAM AND RES	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS(1000AC.FT.)													
AVG 1922 THRU 1965	65.59	51.19	35.89	34.38	34.45	76.13	130.65	145.55	150.15	123.42	44.53	75.81	967.7
FY 1980	8.88	81.42	15.47	21.79	65.02	193.78	230.88	31.14	20.32	12.60	8.94	.97	691.2
RELEASES(1000AC.FT.)													
AVG 1976 THRU 1980	10.18	33.22	21.41	11.47	23.04	84.48	130.80	77.91	112.44	165.08	24.39	25.50	719.9
FY 1980	4.30	52.30	35.39	21.15	49.37	73.60	358.56	30.86	12.68	11.98	3.93	4.21	658.4
RAINFALL(INCHES)													
AVG 1930 THRU 1977	2.65	1.67	1.16	.88	.96	1.96	3.05	4.55	4.95	3.89	3.43	4.17	33.32
FY 1980	2.97	1.64	.15	.81	.54	2.78	.61	.77	1.69	.16	4.47	.79	17.38
DEVIATION	.32	-.03	-1.01	-.07	-.42	.82	-2.44	-3.78	-3.26	-3.73	1.04	-3.38	-15.94
POOL ELEVATION													
END OF MONTH	1039.02	1041.20	1039.03	1039.00	1040.66	1049.65	1039.43	1038.96	1039.19	1038.40	1038.29	1037.41	
MAXIMUM	1039.02	1042.60	1041.20	1039.60	1042.41	1049.65	1055.38	1039.43	1039.44	1039.19	1038.65	1038.28	
MINIMUM	1038.58	1039.02	1038.96	1038.87	1039.00	1038.79	1039.43	1038.85	1038.75	1038.40	1038.29	1037.41	
POOL CONTENT-EOM													
(1000AC.FT)	71.47	92.87	71.57	71.28	87.34	204.06	75.34	70.93	73.08	65.97	65.00	57.55	

ARKANSAS RIVER BASIN

PENSACOLA (Grand) LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS(1000AC.FT.)													
AVG 1923 THRU 1977	340.04	324.13	245.40	260.09	285.68	455.00	625.42	721.37	752.16	411.64	175.32	275.35	4871.6
FY 1980	35.70	612.99	111.47	94.81	219.17	505.59	802.91	213.02	119.40	26.38	44.43	17.85	2803.7
RELEASES(1000AC.FT.)													
AVG 1976 THRU 1980	160.39	215.36	175.16	102.22	129.05	411.38	522.58	357.08	386.33	681.70	235.74	211.74	3588.7
FY 1980	10.69	240.93	427.50	90.53	224.29	354.01	665.71	148.11	117.20	155.76	121.16	103.83	2659.7
RAINFALL(INCHES)													
AVG 1930 THRU 1977	3.44	2.62	1.93	1.74	1.75	2.86	4.08	5.19	5.32	3.64	3.37	4.83	40.77
FY 1980	2.02	3.93	.08	.12	.47	2.24	.51	1.41	2.07	.51	3.51	1.02	17.89
DEVIATION	-1.42	1.31	-1.85	-1.62	-1.28	-.62	-3.57	-3.78	-3.25	-3.13	.14	-3.81	-22.88
POOL ELEVATION													
END OF MONTH	736.12	744.87	736.52	736.35	736.17	739.55	742.60	743.92	743.53	739.84	737.18	734.20	
MAXIMUM	736.12	746.47	744.87	736.85	737.85	739.55	744.44	743.92	744.23	743.53	739.84	737.22	
MINIMUM	735.49	736.12	736.38	736.13	736.15	736.05	739.55	742.38	743.50	739.84	737.15	734.16	
POOL CONTENT-EOM													
(1000AC.FT)	1298.56	1666.02	1313.76	1307.30	1300.46	1433.55	1563.40	1622.40	1604.85	1445.44	1339.02	1228.28	

ARKANSAS RIVER BASIN

LAKE HUDSON	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS(1000AC.FT.)													
AVG 1923 THRU 1977	388.47	333.45	283.02	292.19	326.78	488.81	705.69	829.43	829.39	477.30	231.98	302.67	5489.2
FY 1980	15.53	297.56	428.92	110.58	245.02	415.64	708.69	186.84	130.02	155.34	123.37	106.14	2923.6
RELEASES(1000AC.FT.)													
AVG 1976 THRU 1980	169.91	243.94	196.54	113.68	154.84	481.22	733.92	412.74	528.96	730.79	240.00	220.38	4226.9
FY 1980	8.03	272.37	441.04	96.55	262.55	422.02	716.21	167.80	132.63	147.31	117.94	96.97	2881.4
RAINFALL(INCHES)													
AVG 1930 THRU 1977	3.86	2.93	2.21	1.97	2.11	3.12	4.32	5.50	5.22	3.29	3.43	4.88	42.84
FY 1980	2.00	3.94	.39	.75	.52	2.63	1.01	2.34	2.51	1.00	3.08	2.99	23.16
DEVIATION	-1.86	1.01	-1.92	-1.22	-1.59	-.49	-3.31	-3.16	-2.71	-2.29	-.35	-1.89	-19.68
POOL ELEVATION													
END OF MONTH	618.94	619.55	619.12	620.26	619.14	619.06	619.10	619.41	618.91	619.81	619.32	619.62	
MAXIMUM	619.68	621.29	619.96	620.32	620.26	620.37	620.04	619.68	620.13	620.02	619.86	619.91	
MINIMUM	618.20	618.25	618.64	619.03	618.68	618.71	618.26	618.47	618.41	618.49	618.76	618.42	
POOL CONTENT-EOM (1000AC.FT)	199.66	206.38	201.62	214.31	201.85	200.96	201.40	204.83	199.34	209.25	203.83	207.15	

ARKANSAS RIVER BASIN

FORT GIBSON LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS(1000AC.FT.)													
AVG 1923 THRU 1962	431.30	322.90	258.40	289.20	352.30	489.50	831.60	1037.90	946.20	504.08	251.40	341.70	6056.4
FY 1980	17.50	326.28	456.79	109.39	285.52	476.83	772.17	215.46	155.31	132.93	125.81	107.11	3181.1
RELEASES(1000AC.FT.)													
AVG 1976 THRU 1980	186.20	259.80	224.59	142.98	153.59	511.90	775.26	470.89	527.37	815.78	247.42	220.67	4536.4
FY 1980	21.74	278.55	478.32	119.00	261.44	419.17	791.75	232.42	150.95	146.88	111.52	99.50	3111.2
RAINFALL(INCHES)													
AVG 1930 THRU 1977	3.72	2.90	2.22	1.39	2.15	3.11	4.32	5.40	5.09	3.13	3.25	4.15	41.43
FY 1980	1.96	3.13	.37	.59	.47	2.37	.77	2.69	3.33	.34	2.21	3.70	21.93
DEVIATION	-1.76	.23	-1.85	-1.40	-1.68	-.74	-3.55	-2.71	-1.76	-2.79	-1.04	-.45	-19.50
POOL ELEVATION													
END OF MONTH	553.21	555.02	553.75	553.00	554.07	556.80	555.57	554.59	555.06	554.18	554.26	554.17	
MAXIMUM	553.88	555.65	555.60	554.44	554.23	556.80	556.80	555.57	555.57	555.78	554.64	555.13	
MINIMUM	552.97	552.70	553.54	552.85	552.46	552.65	554.03	554.28	553.77	553.85	554.03	554.13	
POOL CONTENT-EOM (1000AC.FT)	350.43	384.90	360.52	346.50	366.55	421.22	395.90	376.59	385.70	368.67	370.22	368.48	

ARKANSAS RIVER BASIN

WEBBERS FALLS L+D	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS(1000AC.FT.)													
AVG 1923 THRU 1961	1241.40	785.50	655.50	602.00	690.90	934.00	1555.00	2508.10	2314.10	1640.50	925.40	834.40	14687.6
FY 1980	92.59	1356.50	1024.26	365.75	577.19	1006.31	2463.77	1755.37	1423.34	619.04	238.41	283.24	11205.8
RELEASES(1000AC.FT.)													
AVG 1976 THRU 1980	324.65	752.93	423.14	283.72	348.62	1083.62	1697.47	1565.06	1615.08	1648.60	492.86	557.02	10792.8
FY 1980	90.52	1337.57	1027.50	384.00	569.40	976.67	2430.59	1753.02	1413.65	618.82	231.02	281.16	11113.9
RAINFALL(INCHES)													
AVG 1930 THRU 1977	3.52	2.79	2.14	1.93	2.14	2.95	4.30	5.22	5.00	3.11	2.99	4.35	40.44
FY 1980	2.18	4.46	.41	.54	.24	1.91	1.31	3.20	7.07	.26	1.76	4.62	27.96
DEVIATION	-1.34	1.67	-1.73	-1.39	-1.90	-1.04	-2.99	-2.02	2.07	-2.85	-1.23	.27	-12.48
POOL ELEVATION													
END OF MONTH	488.62	490.22	489.67	487.47	487.35	490.23	489.93	490.04	490.50	490.23	489.47	489.58	
MAXIMUM	489.74	490.31	490.22	490.20	490.08	490.30	490.35	490.33	490.53	490.58	490.61	490.11	
MINIMUM	487.36	487.52	487.58	487.47	487.35	487.33	487.82	487.40	488.23	489.77	489.41	489.48	
POOL CONTENT-EOM (1000AC.FT)	150.76	167.66	161.70	139.41	138.26	167.77	164.46	165.65	170.80	167.77	159.58	160.75	

ARKANSAS RIVER BASIN

TENKILLER LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS(1000AC.FT.)													
AVG 1923 THRU 1971	54.06	59.60	75.26	95.66	99.58	126.53	171.28	198.38	115.63	54.87	42.85	31.93	1115.6
FY 1980	10.21	29.65	16.74	14.83	22.12	63.91	55.24	62.45	26.21	4.89	1.74	5.34	313.3
RELEASES(1000AC.FT.)													
AVG 1976 THRU 1980	44.45	24.79	39.84	46.85	34.19	59.54	127.65	119.09	59.83	50.13	42.84	25.40	674.6
FY 1980	39.49	23.36	16.01	33.63	43.28	38.96	3.48	34.37	33.12	49.26	41.55	19.44	375.0
RAINFALL(INCHES)													
AVG 1930 THRU 1977	3.71	3.16	2.65	2.26	2.69	3.50	4.70	5.63	4.86	3.22	3.38	4.43	44.19
FY 1980	1.86	2.16	.56	.15	.17	2.26	.30	1.95	3.84	.38	.98	3.43	18.04
DEVIATION	-1.85	-1.00	-2.09	-2.11	-2.52	-1.24	-4.40	-3.68	-1.02	-2.84	-2.40	-1.00	-26.15
POOL ELEVATION													
END OF MONTH	628.14	628.50	628.46	626.70	624.72	626.63	630.60	632.43	631.47	627.18	623.04	621.43	
MAXIMUM	630.96	628.50	629.00	628.65	626.70	626.63	630.60	632.87	632.53	631.49	627.18	623.16	
MINIMUM	628.13	626.85	628.33	626.70	624.29	622.27	626.63	630.60	631.30	627.18	623.03	621.40	
POOL CONTENT-EOM (1000AC.FT)	605.82	610.25	609.76	588.26	565.15	587.43	636.08	659.73	647.16	594.01	545.66	527.69	

ARKANSAS RIVER BASIN

CONCHAS LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Inflows (1000 Ac. Ft.)													
Avg 1940 thru 1980	17.6	21.5	19.9	10.6	3.8	3.5	4.8	8.1	14.6	22.1	32.8	16.7	176.0
FY 1980	27.7	.4	2.2	2.5	2.4	1.4	1.9	41.5	14.8	4.7	1.5	2.3	77.3
Releases (1000 Ac. Ft.)													
Avg 1941 thru 1980	4.0	1.1	1.0	.8	1.0	.7	14.1	10.8	8.3	8.1	9.2	12.7	71.8
FY 1980	15.1	.4	.04	.02	.03	.3	6.7	3.6	16.1	26.1	10.4	6.7	85.4
Rainfall (Inches)													
Avg 1940 thru 1980	.94	.43	.42	.32	.35	.56	.88	1.38	1.44	2.54	2.34	1.50	13.10
FY 1980	.53	.52	.21	.33	.84	.80	1.82	2.01	.28	1.15	1.58	2.37	12.44
Pool Elevation (EOM)	4176.59	4175.40	4175.56	4175.87	4176.11	4175.93	4174.47	4181.19	4180.02	4175.05	4172.56	4171.14	
Maximum	4178.32	4175.59	4175.56	4175.87	4176.14	4176.11	4175.90	4181.19	4181.47	4179.90	4174.89	4172.52	4181.47
Minimum	4175.59	4175.40	4175.40	4175.57	4175.88	4175.88	4174.45	4174.48	4180.02	4175.05	4172.56	4171.14	4171.14
Pool Contents (EOM) (1000 Ac. Ft.)	150.9	150.0	150.1	152.3	153.5	152.6	145.5	180.6	174.0	148.3	136.5	130.1	1824.4

(Meredith)

SANFORD RESERVOIR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS(1000AC.FT.)													
AVG 1923 THRU 1961	28.80	3.30	2.20	3.60	1.60	1.80	14.40	49.60	45.20	47.90	41.70	39.40	279.6
FY 1980	.96	3.58	1.01	4.57	7.42	8.46	1.68	17.65	11.78	.86	7.85	.26	66.1
RELEASES(1000AC.FT.)													
LAKE HAS NOT FILLED													
RAINFALL(INCHES)													
AVG 1930 THRU 1977	1.36	.56	.50	.43	.47	.67	1.13	2.44	2.35	2.75	2.48	1.65	16.79
FY 1980	1.12	.22	.04	.29	.04	.31	.70	2.40	.98	1.12	1.89	.72	9.83
DEVIATION	-.24	-.34	-.46	-.14	-.43	-.36	-.43	-.04	-1.37	-1.63	-.59	-.93	-6.96
POOL ELEVATION													
END OF MONTH	2890.15	2889.74	2889.02	2888.79	2889.29	2889.12	2888.05	2888.77	2888.29	2886.19	2885.12	2883.59	
MAXIMUM	2891.48	2890.20	2889.76	2889.02	2889.38	2889.33	2889.12	2888.79	2889.08	2888.29	2886.19	2885.12	
MINIMUM	2890.01	2889.74	2889.02	2888.70	2888.70	2888.62	2888.05	2888.05	2888.29	2886.19	2885.12	2883.59	
POOL CONTENT-EOM (1000AC.FT)	278.44	274.82	268.52	266.54	270.89	269.40	260.17	266.37	262.24	244.60	235.91	223.86	

ARKANSAS RIVER BASIN

(Thunderbird)

NORMAN RESERVOIR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS(1000AC.FT.)													
AVG 1926 THRU 1961	3.80	.90	1.60	1.10	2.10	4.20	9.50	13.70	12.10	4.40	.70	2.40	56.5
FY 1980	.49	1.41	1.45	2.35	2.36	2.16	3.75	23.94	3.73	.10	.09	.33	42.2
RELEASES(1000AC.FT.)													
AVG 1976 THRU 1980	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.75	2.27	1.03	0.00	0.00	4.0
FY 1980	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.73	11.33	0.00	0.00	0.00	15.1
RAINFALL(INCHES)													
AVG 1930 THRU 1977	2.96	2.03	1.52	1.31	1.53	2.23	3.52	5.33	4.30	2.93	2.66	3.60	33.92
FY 1980	1.26	2.00	1.69	1.64	.75	1.04	1.45	7.08	3.23	.09	.89	1.91	23.03
DEVIATION	-1.70	-.03	.17	.33	-.78	-1.19	-2.07	1.75	-1.07	-2.84	-1.77	-1.69	-10.89
POOL ELEVATION													
END OF MONTH	1037.73	1037.71	1037.78	1037.92	1038.05	1038.00	1038.06	1040.96	1039.12	1038.03	1037.01	1036.35	
MAXIMUM	1038.28	1037.82	1037.78	1038.00	1038.12	1038.05	1038.08	1040.96	1040.97	1039.12	1038.03	1037.01	
MINIMUM	1037.71	1037.45	1037.51	1037.69	1037.91	1037.90	1037.80	1038.06	1038.96	1038.03	1037.01	1036.29	
POOL CONTENT-EOM													
(1000AC.FT)	112.03	111.92	112.32	113.13	113.90	113.60	113.96	131.94	120.33	113.78	107.86	104.22	

ARKANSAS RIVER BASIN

OPTIMA LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS(1000AC.FT.)													
AVG 1939 THRU 1977	2.47	.92	.75	.88	.95	1.16	1.84	6.28	7.23	4.49	3.84	3.57	-0.0
FY 1980	.42	.16	.21	.36	.36	.31	.59	1.88	.42	.05	.41	.08	5.2
RELEASES(1000AC.FT.)													
LAKE HAS NOT FILLED													
RAINFALL(INCHES)													
AVG 1930 THRU 1977	1.17	.58	.41	.36	.42	.76	1.21	2.55	2.24	2.73	2.45	1.67	16.55
FY 1980	.55	0.00	.01	.08	.01	.31	.66	1.22	.97	.55	.99	.22	5.57
DEVIATION	-.62	-.58	-.40	-.28	-.41	-.45	-.55	-1.33	-1.27	-2.18	-1.46	-1.45	-10.98
POOL ELEVATION													
END OF MONTH	2720.10	2720.10	2720.20	2720.50	2720.80	2721.10	2721.40	2722.90	2722.50	2721.30	2720.80	2720.20	
MAXIMUM	2720.20	2720.20	2720.20	2720.50	2720.80	2721.10	2721.40	2722.90	2722.90	2722.50	2721.30	2720.80	
MINIMUM	2719.60	2719.90	2720.10	2720.20	2720.50	2720.80	2721.10	2721.40	2722.50	2721.30	2720.80	2720.20	
POOL CONTENT-EOM													
(1000AC.FT)	4.82	4.82	4.92	5.20	5.48	5.77	6.06	7.61	7.19	5.97	5.48	4.92	

ARKANSAS RIVER BASIN

FORT SUPPLY LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS(1000AC.FT.)													
AVG 1923 THRU 1966	7.40	3.70	1.70	1.70	2.00	2.70	4.70	13.00	13.80	5.20	4.10	4.40	64.5
FY 1980	2.70	3.74	2.69	3.24	3.29	3.69	9.00	10.21	7.22	1.01	.57	.11	47.5
RELEASES(1000AC.FT.)													
AVG 1976 THRU 1980	.04	1.05	.90	.95	1.61	1.45	3.03	14.33	5.69	.54	.38	.50	30.5
FY 1980	.12	4.46	2.28	3.37	2.84	1.75	8.39	8.19	8.67	.09	0.00	0.00	40.2
RAINFALL(INCHES)													
AVG 1930 THRU 1977	1.61	.96	.66	.55	.80	1.14	1.72	3.47	3.09	2.47	2.47	1.86	20.80
FY 1980	2.54	.23	.04	.23	.01	1.43	2.12	3.06	1.47	1.18	2.40	.24	14.95
DEVIATION	.93	-.73	-.62	-.32	-.79	.29	.40	-.41	-1.62	-1.29	-.07	-1.62	-5.85
POOL ELEVATION													
END OF MONTH	2004.66	2004.11	2004.20	2004.03	2004.08	2004.95	2005.04	2005.51	2004.22	2003.64	2003.01	2002.34	
MAXIMUM	2004.66	2004.79	2004.23	2004.41	2004.32	2004.95	2005.89	2005.55	2005.87	2004.23	2003.64	2003.01	
MINIMUM	2003.31	2003.99	2003.92	2003.98	2004.02	2003.95	2004.17	2004.04	2004.07	2003.64	2003.01	2002.34	
POOL CONTENT-EOM													
(1000AC.FT)	15.17	14.10	14.28	13.95	14.04	15.73	15.91	16.88	14.32	13.24	12.10	10.99	

ARKANSAS RIVER BASIN

CANTON LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS(1000AC.FT.)													
AVG 1923 THRU 1966	22.90	5.70	3.90	4.20	5.60	7.50	13.80	39.90	42.50	17.50	11.50	13.70	189.3
FY 1980	1.19	7.57	4.85	6.00	8.20	7.66	18.11	49.80	38.18	5.95	.05	0.00	147.5
RELEASES(1000AC.FT.)													
AVG 1976 THRU 1980	6.44	.20	8.17	4.08	1.53	3.21	5.46	4.19	15.73	3.88	1.56	7.45	61.9
FY 1980	.69	.53	.50	3.19	7.45	3.24	24.68	19.27	47.66	3.55	.27	.12	111.2
RAINFALL(INCHES)													
AVG 1930 THRU 1977	1.48	.92	.60	.51	.71	1.09	1.64	3.20	2.81	2.58	2.54	1.83	19.91
FY 1980	2.24	.41	.06	.59	.22	1.18	1.46	3.09	1.44	.73	1.60	.57	13.59
DEVIATION	.76	-.51	-.54	.08	-.49	.09	-.18	-.11	-1.37	-1.85	-.94	-1.26	-6.32
POOL ELEVATION													
END OF MONTH	1613.90	1614.73	1615.09	1615.30	1615.23	1615.59	1614.51	1617.84	1616.06	1615.35	1614.35	1613.67	
MAXIMUM	1614.43	1614.78	1615.09	1615.39	1615.48	1615.63	1615.62	1617.84	1618.09	1616.13	1615.35	1614.35	
MINIMUM	1613.78	1613.90	1614.70	1615.07	1615.16	1615.13	1613.30	1614.51	1616.06	1615.35	1614.35	1613.67	
POOL CONTENT-EOM													
(1000AC.FT)	106.06	112.42	115.22	116.90	116.34	119.22	110.73	138.11	116.61	110.95	103.20	98.10	

ARKANSAS RIVER BASIN

EUFAULA LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS(1000AC.FT.)													
AVG 1923 THRU 1978	329.09	249.47	213.86	214.29	268.70	364.27	545.47	801.15	593.79	259.73	146.22	222.09	4208.1
FY 1980	26.38	200.73	43.83	44.03	71.40	93.62	147.77	576.20	461.55	19.04	3.27	20.23	1708.1
RELEASES(1000AC.FT.)													
AVG 1976 THRU 1980	90.30	77.76	54.28	105.37	68.02	42.47	151.68	384.34	436.16	241.57	121.23	55.13	1829.3
FY 1980	128.28	55.03	36.84	214.03	176.33	72.72	8.51	130.73	381.61	324.84	148.63	39.53	1717.1
RAINFALL(INCHES)													
AVG 1930 THRU 1977	3.24	2.42	1.92	1.64	1.98	2.71	3.91	5.44	4.39	3.10	2.90	4.03	37.68
FY 1980	1.50	2.25	.53	.78	.51	.77	1.43	4.36	4.04	.34	.84	3.52	20.87
DEVIATION	-1.74	-.17	-1.39	-.86	-1.47	-1.94	-2.48	-1.08	-.35	-2.76	-2.06	-.51	-16.81
POOL ELEVATION													
END OF MONTH	582.85	584.07	583.97	582.06	580.76	580.68	581.92	586.07	586.32	582.54	580.11	579.43	
MAXIMUM	584.35	584.10	584.21	584.05	582.06	580.86	581.92	586.07	586.44	586.32	582.54	580.15	
MINIMUM	582.59	582.47	583.88	582.06	580.70	580.11	580.68	581.92	584.83	582.54	580.11	579.24	
POOL CONTENT-EOM (1000AC.FT)	2116.57	2235.58	2225.57	2042.15	1924.63	1917.60	2029.23	2440.99	2467.39	2087.37	1867.56	1809.16	

ARKANSAS RIVER BASIN

R.S.KERR LOCK AND DAM	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS(1000AC.FT.)													
AVG 1923 THRU 1960	1628.20	1073.50	1006.60	1061.90	1120.80	1509.50	2213.00	3584.70	3196.60	2192.00	1217.50	1063.90	20868.2
FY 1980	278.08	1437.72	1128.60	631.54	866.97	1131.37	2461.29	1970.97	1804.76	891.57	401.06	310.41	13514.3
RELEASES(1000AC.FT.)													
AVG 1976 THRU 1980	445.53	851.74	537.30	462.65	502.63	1321.63	2097.02	2256.70	2207.57	1929.78	675.22	623.85	13911.6
FY 1980	250.27	1437.58	1116.66	625.18	845.66	1123.40	2391.28	1970.95	1796.70	842.96	368.95	291.05	13060.6
RAINFALL(INCHES)													
AVG 1930 THRU 1977	3.69	3.05	2.63	2.16	2.64	3.42	4.63	5.55	4.64	3.21	3.24	4.27	43.13
FY 1980	2.31	1.67	.49	.22	.38	1.89	1.33	3.41	5.51	1.06	.60	5.73	24.60
DEVIATION	-1.38	-1.38	-2.14	-1.94	-2.26	-1.53	-3.30	-2.14	.87	-2.15	-2.64	1.46	-18.53
POOL ELEVATION													
END OF MONTH	459.55	459.14	459.27	459.31	458.79	458.41	459.70	459.17	458.74	459.34	459.30	459.73	
MAXIMUM	459.90	459.97	459.87	459.59	459.83	459.92	460.47	460.16	460.74	460.28	460.09	460.15	
MINIMUM	458.70	458.85	458.20	458.91	458.47	458.05	458.30	458.25	458.21	458.62	459.21	459.30	
POOL CONTENT-EOM (1000AC.FT)	475.69	459.37	464.55	466.14	445.46	430.38	481.66	460.57	443.48	467.33	465.74	482.85	

ARKANSAS RIVER BASIN

W.D. MAYO LOCK AND DAM	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS(1000AC.FT.)													
AVG 1923 THRU 1960	1628.20	1073.50	1006.60	1061.90	1130.70	1509.50	2213.00	3584.70	3196.60	2192.00	1217.50	1063.90	20878.1
FY 1980	329.95	1439.70	1208.83	693.22	936.60	1199.80	2486.08	2085.02	1836.69	904.26	423.29	332.43	13875.9
RELEASES(1000AC.FT.)													
AVG 1976 THRU 1980	495.47	891.24	588.70	516.02	524.70	1430.44	2129.64	2173.75	2258.95	1964.29	727.04	673.65	14373.9
FY 1980	330.14	1437.94	1209.07	692.06	937.04	1198.56	2485.03	2083.73	1833.97	903.26	427.20	331.09	13869.1
RAINFALL(INCHES)													
AVG 1930 THRU 1977	3.45	3.29	2.76	2.26	2.83	3.63	4.54	5.48	4.31	3.19	3.08	4.17	42.99
FY 1980	2.52	1.79	1.74	.41	.54	2.35	1.10	3.50	2.90	.84	.14	4.65	22.48
DEVIATION	-.93	-1.50	-1.02	-1.85	-2.29	-1.28	-3.44	-1.98	-1.41	-2.35	-2.94	.48	-20.51
POOL ELEVATION													
END OF MONTH	412.33	412.94	412.67	412.89	412.66	412.80	412.75	412.78	412.89	412.87	412.76	412.79	
MAXIMUM	413.20	413.09	413.22	413.17	413.05	413.17	413.09	413.12	413.05	413.16	413.18	413.22	
MINIMUM	412.00	412.00	412.10	412.00	412.22	412.00	411.98	412.05	411.96	412.07	412.17	412.18	
POOL CONTENT-EOM (1000AC.FT)	14.70	15.67	15.24	15.59	15.23	15.45	15.37	15.42	15.59	15.56	15.39	15.44	

ARKANSAS RIVER BASIN

WISTER LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS(1000AC.FT.)													
AVG 1938 THRU 1970	15.73	42.54	58.34	75.08	101.10	119.00	138.30	143.40	46.25	25.42	10.33	18.49	794.1
FY 1980	4.26	8.20	56.83	21.01	36.93	29.51	58.00	130.75	28.79	.64	.06	.74	375.7
RELEASES(1000AC.FT.)													
AVG 1976 THRU 1980	1.17	5.91	45.49	43.90	40.95	112.82	74.19	86.86	70.54	19.62	6.58	6.26	514.3
FY 1980	.74	10.08	74.22	39.27	35.90	23.56	58.19	128.09	1.21	.92	1.10	.65	373.9
RAINFALL(INCHES)													
AVG 1930 THRU 1977	3.46	3.56	3.14	2.74	3.17	3.98	4.69	5.73	4.13	3.59	3.36	4.17	45.72
FY 1980	2.12	1.17	2.32	.21	.45	1.64	1.10	3.67	2.71	2.23	.19	4.57	22.38
DEVIATION	-1.34	-2.39	-.82	-2.53	-2.72	-2.34	-3.59	-2.06	-1.42	-1.36	-3.17	.40	-23.34
POOL ELEVATION													
END OF MONTH	477.89	477.44	475.32	471.42	471.55	472.78	472.75	472.91	477.37	476.44	475.49	475.12	
MAXIMUM	477.89	478.34	478.49	475.32	473.72	472.92	474.09	478.88	477.41	477.37	476.44	475.49	
MINIMUM	477.40	477.44	471.85	471.42	471.40	471.54	471.83	471.69	472.91	476.44	475.49	474.95	
POOL CONTENT-EOM (1000AC.FT)	61.59	58.44	45.09	26.39	26.90	32.11	31.98	32.68	57.95	51.81	46.07	43.93	

SUMMARY OF LAKE CONDITIONS FOR WATER YEAR 1980

ARKANSAS RIVER BASIN

LOCK AND DAM NO. 13	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Releases (1,000 AC. FT.)													
Avg 1971 thru 1980	1,351.2	2,556.3	1,988.3	1,613.2	1,538.0	3,152.7	3,042.7	3,117.0	3,203.0	1,678.4	711.3	879.7	24,831.8
WY 1980	240.7	1,362.3	1,245.8	628.4	879.5	1,238.1	2,606.5	2,326.4	1,843.5	809.5	340.2	264.8	13,785.7
Project Rainfall (inches)													
Avg 1972 thru 1980	3.0	4.6	2.5	1.6	2.1	4.8	3.2	4.3	4.0	2.6	2.3	4.3	39.3
WY 1980	3.6	1.9	2.7	0.9	0.3	3.2	1.7	6.1	2.5	0.9	0.4	3.0	27.2
Deviation	-0.6	-2.7	+0.2	-0.7	-1.8	-1.6	-1.5	+1.8	-1.5	-1.7	-1.9	-1.3	-12.1
Pool Elevation													
End of Month	391.97	391.31	392.09	391.85	391.88	391.10	391.34	391.40	392.20	392.18	391.56	391.40	
Maximum	392.35	392.38	392.20	392.22	392.28	392.14	392.34	392.20	392.30	392.28	392.40	392.42	392.42
Minimum	391.45	390.40	391.0	391.12	390.64	390.90	389.30	390.32	389.81	391.22	391.25	391.25	389.30
Pool Content EOM (1,000 AC. FT.)	58.9	54.5	59.7	58.1	58.3	53.2	54.7	55.1	60.5	60.4	56.2	55.1	

OZARK-JETA TAYLOR LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Releases (1,000 AC. FT.)													
Avg 1972 thru 1980	1,205.2	2,797.5	2,313.6	1,701.4	1,687.0	3,600.3	3,518.9	3,449.1	3,454.1	1,778.8	770.9	905.7	27,182.5
WY 1980	278.0	1,399.5	1,305.8	714.8	935.0	1,282.2	2,691.6	2,412.3	1,820.0	820.7	358.6	273.3	14,291.8
Project Rainfall (inches)													
Avg 1973 thru 1980	2.9	5.3	3.2	2.2	2.4	5.4	3.7	4.9	4.3	3.4	2.0	4.7	44.4
WY 1980	2.4	2.8	3.0	1.0	0.7	4.0	2.4	5.9	2.4	1.8	0.2	3.6	30.2
Deviation	-0.5	-2.5	-0.2	-1.2	-1.7	-1.4	-1.3	+1.0	-1.9	-1.6	-1.8	-1.1	-14.2
Pool Elevation													
End of Month	370.79	372.48	371.00	370.62	371.58	372.55	372.60	371.39	371.32	371.36	370.72	371.48	
Maximum	371.99	372.50	372.58	372.02	372.00	372.56	372.68	372.63	372.51	372.40	372.76	372.44	372.76
Minimum	370.27	370.00	370.10	370.34	370.26	370.12	370.16	370.26	370.30	370.47	370.08	370.63	370.00
Pool Content EOM (1,000 AC. FT.)	136.7	154.0	138.7	135.9	144.3	155.0	155.4	142.5	141.8	142.2	136.0	143.4	

SUMMARY OF LAKE CONDITIONS FOR WATER YEAR 1980

ARKANSAS RIVER BASIN

DARDANELLE LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Releases (1,000 AC. FT.)													
Avg 1966 thru 1980	1,303.1	2,233.1	2,024.1	1,680.3	1,714.7	2,914.0	3,211.3	3,418.7	2,968.1	1,684.0	807.4	912.6	24,871.4[2]
WY 1980	264.6	1,402.7	1,433.0	775.4	1,058.4	1,407.6	2,796.9	2,732.6	1,936.8	848.9	360.4	283.4	15,300.7
Project Rainfall (inches)													
Avg 1971 thru 1980	3.9	5.1	4.6	2.6	3.0	5.7	4.2	5.3	4.6	2.2	2.8	4.4	48.4
WY 1980	3.7	1.2	3.9	1.2	0.6	3.3	4.3	4.6	1.6	0.3	0.0	6.5	31.2
Deviation	-0.2	-3.9	-0.7	-1.4	-2.4	-2.4	+0.1	-0.7	-3.0	-1.9	-2.8	+2.1	-17.2
Pool Elevation													
End of Month	337.83	337.51	337.85	337.65	337.03	337.90	338.22	337.90	337.66	337.70	337.42	336.91	
Maximum	337.98	338.22	338.15	338.00	338.14	338.25	338.30	338.22	338.39	338.37	338.00	337.60	338.39
Minimum	336.99	336.88	336.47	337.13	337.03	336.77	336.27	336.86	336.82	337.29	337.03	336.91	336.27
Pool Content EOM (1,000 AC. FT.)	480.5	469.8	481.2	474.5	453.7	482.9	493.9	482.9	474.8	476.2	466.8	449.8	

BLUE MOUNTAIN LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Inflows (1,000 AC. FT.)													
Avg 1948 thru 1980	6.0	21.6	30.6	39.9	44.3	65.1	58.3	55.9	15.5	11.1	5.4	5.5	359.2
WY 1980	0.7	1.0	28.4	14.1	19.6	19.1	38.4	55.9	3.2	0.1	0.1	1.0	181.6
Releases (1,000 AC. FT.)													
Avg 1948 thru 1980	4.7	13.5	31.1	35.9	40.1	48.8	45.9	54.5	35.4	18.9	12.6	7.3	348.7
WY 1980	0.5	0.3	21.4	20.6	19.4	6.8	40.3	51.0	7.4	0.6	0.3	0.4	169.0
Basin Rainfall (inches)													
Avg 1948 thru 1980	3.1	3.4	3.3	2.6	2.9	4.1	4.3	5.1	3.5	4.0	3.2	3.7	43.2
WY 1980	2.8	1.5	4.7	1.7	0.6	3.0	4.0	5.7	2.2	0.7	0.0	6.4	33.3
Deviation	-0.3	-1.9	+1.4	-0.9	-2.3	-1.1	-0.3	+0.6	-1.3	-3.3	-3.2	+2.7	-9.9
Pool Elevation													
End of Month	384.08	384.23	386.39	384.22	384.17	387.85	387.00	388.11	386.78	385.61	384.65	384.51	
Maximum	384.18	384.27	390.45	386.39	384.65	387.85	392.70	393.34	388.11	386.48	385.61	384.65	393.34
Minimum	383.84	384.06	384.17	384.01	383.96	384.01	386.96	386.97	386.48	385.61	384.65	384.16	383.84
Pool Content EOM (1,000 AC. FT.)	24.9	25.3	32.1	25.3	25.2	37.0	34.1	37.9	32.4	29.6	26.6	26.2	

AD-A156 495 RESERVOIR CONTROL CENTER: ACTIVITIES AND ACCOMPLISHMENTS OF THE SOUTHWEST..(U) CORPS OF ENGINEERS DALLAS TX SOUTHWESTERN DIV JAN 81

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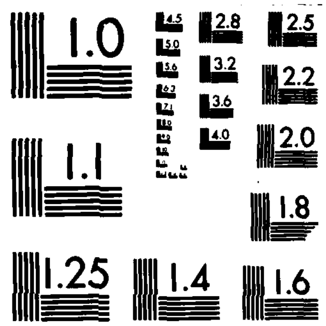

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SUMMARY OF LAKE CONDITIONS FOR WATER YEAR 1980

ARKANSAS RIVER BASIN

LOCK AND DAM NO. 9	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Releases (1,000 AC. FT.)													
Avg 1970 thru 1980	1,488.7	2,796.8	2,938.2	1,926.2	1,774.9	3,511.4	3,758.4	3,783.5	3,394.0	1,693.5	757.5	982.2	28,805.3
WY 1980	323.5	1,436.6	1,550.1	864.2	1,102.6	1,397.2	2,792.2	2,770.0	1,903.0	875.1	413.8	311.4	15,739.7
Project Rainfall (inches)													
Avg 1971 thru 1980	3.2	4.7	4.3	2.6	2.6	5.1	4.2	4.8	4.6	2.7	2.7	4.7	46.2
WY 1980	2.4	2.2	2.7	1.1	1.2	2.9	6.2	5.4	2.2	0.8	1.2	5.9	34.2
Deviation	-0.8	-2.5	-1.6	-1.5	-1.4	-2.2	+2.0	+0.6	-2.4	-1.9	-1.5	+1.2	-12.0
Pool Elevation													
End of Month	286.57	286.50	286.54	285.81	286.78	286.17	285.48	286.80	286.86	287.3	286.40	286.60	
Maximum	287.30	286.98	287.20	287.35	287.27	287.08	287.02	287.47	286.98	287.65	287.77	287.33	287.77
Minimum	285.09	284.98	284.36	284.97	284.88	284.85	284.79	284.68	285.21	285.56	285.01	284.66	284.36
Pool Content EOM (1,000 AC. FT.)	62.2	61.9	62.1	58.1	63.4	60.0	56.4	63.5	63.8	66.6	61.3	62.4	

TOAD SUCK FERRY LOCK AND DAM	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Releases (1,000 AC. FT.)													
Avg 1970 thru 1980	1,391.9	2,827.9	2,534.8	2,136.6	1,945.3	3,883.6	3,963.0	3,940.4	3,487.6	2,426.5	767.4	1,003.0	30,308.0
WY 1980	299.0	1,401.1	1,587.2	857.1	1,103.2	1,470.4	3,007.6	2,842.6	1,920.4	856.7	384.6	300.7	16,030.6
Project Rainfall (inches)													
Avg 1971 thru 1980	3.5	5.3	4.6	2.9	2.8	5.2	4.2	5.1	5.0	2.4	2.4	4.6	48.0
WY 1980	2.1	3.8	3.2	1.9	1.4	3.8	5.7	6.3	2.7	0.6	0.0	3.9	35.4
Deviation	-1.4	-1.5	-1.4	-1.0	-1.4	-1.4	+1.5	+1.2	-2.3	-1.8	-2.4	-0.7	-12.6
Pool Elevation													
End of Month	265.28	264.70	265.32	265.08	265.24	264.68	264.45	264.98	265.26	265.65	265.26	265.40	
Maximum	265.58	265.50	265.68	265.50	265.50	265.68	265.52	265.44	265.60	265.65	265.65	265.52	265.68
Minimum	264.78	264.20	264.62	264.78	264.80	264.67	264.10	264.09	264.22	264.87	264.70	264.02	264.02
Pool Content EOM (1,000 AC. FT.)	34.2	31.8	34.4	33.3	34.0	31.7	30.8	32.9	34.1	35.8	34.1	34.7	

SUMMARY OF LAKE CONDITIONS FOR WATER YEAR 1980

ARKANSAS RIVER BASIN

NIMROD LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Inflows (1,000 AC. FT.)													
Avg 1944 thru 1980	10.6	35.5	59.3	70.7	86.5	102.2	92.4	97.3	33.4	12.4	6.0	7.9	614.2
WY 1980	0.5	3.8	44.8	20.7	28.0	31.0	84.5	93.6	5.8	0.1	0.1	5.8	318.7
Releases (1,000 AC. FT.)													
Avg 1944 thru 1980	8.2	25.5	56.0	64.2	75.9	100.0	95.9	95.9	49.2	24.6	10.8	10.4	616.2
WY 1980	0.3	0.3	35.7	22.6	27.8	26.9	75.0	93.2	5.7	0.4	0.3	3.7	291.9
Basin Rainfall (inches)													
Avg 1944 thru 1980	3.4	3.7	3.7	3.2	3.5	5.1	4.8	5.6	4.0	4.0	3.1	3.8	47.9
WY 1980	3.8	1.3	3.8	1.7	1.2	3.3	4.7	6.3	1.2	1.4	0.2	6.9	35.8
Deviation	+0.4	-2.4	+0.1	-1.5	-2.3	-1.8	-0.1	+0.7	-2.8	-2.6	-2.9	+3.1	-12.1
Pool Elevation													
End of Month	338.92	340.05	342.71	342.10	342.03	343.02	345.01	344.76	344.39	343.59	342.60	342.85	
Maximum	339.02	340.05	348.70	342.71	342.85	343.27	345.33	351.02	344.84	344.39	343.59	342.93	351.02
Minimum	338.76	338.92	340.05	342.08	342.00	342.03	342.02	344.73	344.39	343.59	342.60	342.22	338.76
Pool Content EOM (1,000 AC. FT.)	19.5	22.7	31.5	29.4	29.1	32.6	41.1	40.0	38.4	35.1	31.1	32.0	

MURRAY LOCK AND DAM	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Releases (1,000 AC. FT.)													
Avg 1970 thru 1980	1,569.8	2,858.0	2,812.4	2,236.0	2,042.4	4,031.9	4,157.3	4,337.9	3,577.3	1,731.5	757.9	1,021.4	31,133.8
WY 1980	254.5	1,395.6	1,620.3	877.7	1,129.2	1,503.1	3,193.0	2,982.0	1,937.9	822.4	355.4	271.9	16,343.0
Project Rainfall (inches)													
Avg 1970 thru 1980	3.8	5.0	4.1	3.3	2.8	4.5	5.6	5.4	4.2	2.2	3.0	4.3	48.2
WY 1980	2.7	2.0	2.9	3.0	1.1	4.5	6.6	6.9	0.6	0.0	0.0	2.5	32.8
Deviation	-1.1	-3.0	-1.2	-0.3	-1.7	0.0	+1.0	+1.5	-3.6	-2.2	-3.0	-1.8	-15.4
Pool Elevation													
End of Month	249.60	248.70	249.71	249.44	249.54	248.49	248.95	248.95	249.50	249.84	249.62	249.70	
Maximum	249.98	249.92	249.72	249.92	249.89	249.94	249.27	249.73	250.43	250.12	250.22	249.90	250.43
Minimum	249.55	248.58	248.70	249.20	249.24	248.49	248.22	248.4	248.59	249.46	249.42	249.49	248.22
Pool Content EOM (1,000 AC. FT.)	93.3	84.4	94.4	91.6	92.7	82.5	86.6	86.6	92.3	95.8	93.5	94.3	

SUMMARY OF LAKE CONDITIONS FOR WATER YEAR 1980

ARKANSAS RIVER BASIN

DAVID D. TERRY LOCK AND DAM	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Releases (1,000 AC. FT.)													
Avg 1969 thru 1980	1,443.0	2,672.5	2,911.6	2,487.1	2,391.6	4,087.5	4,267.1	4,316.4	3,682.2	1,877.3	806.0	1,015.2	31,957.5
WY 1980	260.4	1,418.0	1,658.4	901.5	1,160.0	1,541.0	3,265.8	3,069.9	1,955.1	825.3	356.4	291.4	16,703.2
Project Rainfall (inches)													
Avg 1971 thru 1980	3.7	4.8	4.3	4.0	2.8	4.7	4.8	5.0	4.6	3.5	2.4	3.7	48.3
WY 1980	2.3	3.0	3.3	2.4	1.4	5.6	4.3	5.0	0.5	1.5	0.5	4.0	33.8
Deviation	-1.4	-1.8	-1.0	-1.6	-1.4	+0.9	-0.5	0.0	-4.1	-2.0	-1.9	+0.3	-14.5
Pool Elevation													
End of Month	231.28	230.99	230.92	231.02	231.09	230.30	231.02	231.36	231.53	230.99	231.10	231.23	
Maximum	231.60	231.46	231.40	231.53	231.60	231.62	231.21	231.36	231.53	231.67	231.42	231.45	231.67
Minimum	230.94	230.23	230.70	230.79	230.74	230.30	230.29	230.12	230.36	230.80	230.81	230.98	230.12
Pool Content EOM (1,000 AC. FT.)	50.8	49.5	49.2	49.6	49.9	46.8	49.6	51.2	51.9	49.5	50.0	50.6	

LOCK AND DAM NO. 5	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Releases (1,000 AC. FT.)													
Avg 1972 thru 1980	1,522.2	2,888.7	2,746.0	2,336.3	1,968.7	4,121.7	4,310.9	4,307.9	3,696.2	1,800.1	784.0	1,057.9	31,540.6
WY 1980	280.7	1,434.9	1,779.4	995.3	1,234.5	1,667.7	3,337.0	3,151.0	2,025.9	846.2	357.2	313.4	17,423.2
Project Rainfall (inches)													
Avg 1971 thru 1980	3.5	4.9	4.6	3.6	2.9	5.2	4.6	5.7	3.6	3.2	2.3	4.2	48.2
WY 1980	4.0	3.5	5.3	5.0	1.6	9.8	4.4	5.8	0.1	0.4	0.3	8.7	48.9
Deviation	+0.5	-1.4	+0.7	+1.4	-1.3	+4.6	-0.2	+0.1	-3.5	-2.8	-2.0	+4.5	+0.7
Pool Elevation													
End of Month	213.01	213.10	213.27	213.14	212.95	212.42	212.67	213.02	213.35	213.64	213.72	213.04	
Maximum	213.62	213.51	213.43	213.50	213.47	213.46	212.99	213.60	213.35	213.74	213.89	213.87	213.89
Minimum	212.90	211.98	212.61	212.87	212.81	212.30	212.09	212.05	212.25	212.86	213.62	212.90	211.98
Pool Content EOM (1,000 AC. FT.)	61.4	62.0	63.2	62.3	61.0	57.6	59.2	61.4	63.8	65.9	66.5	61.6	

SUMMARY OF LAKE CONDITIONS FOR WATER YEAR 1980

ARKANSAS RIVER BASIN

LOCK AND DAM NO. 4	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Releases (1,000 AC. FT.)													
Avg 1970 thru 1980	1,534.3	2,926.0	2,803.1	2,409.9	2,197.0	4,247.3	4,478.8	4,466.1	3,808.5	1,825.3	793.8	1,075.1	32,565.2
WY 1980	280.8	1,415.4	1,818.3	1,024.5	1,270.4	1,748.7	3,521.5	3,269.4	2,037.5	846.2	363.0	329.5	17,925.2
Project Rainfall (inches)													
Avg 1972 thru 1980	3.5	4.5	4.6	4.4	2.9	5.4	4.5	6.4	3.8	2.8	2.7	5.1	50.6
WY 1980	4.0	4.6	4.2	4.6	2.2	11.4	3.8	6.5	0.0	0.5	1.3	11.1	54.1
Deviation	+0.5	+0.1	-0.4	+0.2	-0.7	+6.0	-0.7	+0.1	-3.8	-2.3	-1.4	+6.0	+3.5
Pool Elevation													
End of Month	195.90	196.01	196.26	196.29	196.07	195.19	195.62	195.70	196.17	196.13	196.20	195.99	
Maximum	196.64	196.42	196.48	196.39	196.32	196.59	196.05	196.42	196.40	196.45	196.48	196.41	196.64
Minimum	195.84	194.95	195.00	195.72	195.76	195.19	195.10	194.88	194.98	195.81	196.00	195.97	194.88
Pool Content EOM (1,000 AC. FT.)	69.9	70.5	72.1	72.3	70.9	66.0	68.3	68.8	71.5	71.3	71.7	70.3	

LOCK AND DAM NO. 3	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Releases (1,000 AC. FT.)													
Avg 1970 thru 1980	1,529.5	2,930.3	2,814.8	2,420.6	2,223.4	4,266.5	4,546.6	4,557.5	3,828.3	1,822.5	783.9	1,059.6	32,783.5
WY 1980	269.8	1,382.1	1,827.4	1,011.6	1,280.5	1,759.0	3,586.8	3,281.7	2,023.2	836.4	358.0	332.2	17,948.7
Project Rainfall (inches)													
Avg 1971 thru 1980	3.3	4.6	4.4	4.5	2.8	5.1	4.3	5.5	3.4	3.8	3.8	4.3	49.8
WY 1980	3.9	5.4	3.8	4.2	1.7	9.6	3.5	6.4	0.7	0.6	0.5	8.8	49.1
Deviation	+0.6	+0.8	-0.6	-0.3	-1.1	+4.5	-0.8	+0.9	-2.7	-3.2	-3.3	+4.5	-0.7
Pool Elevation													
End of Month	182.12	181.98	182.18	182.05	181.90	181.78	181.78	182.27	182.26	182.10	182.12	182.05	
Maximum	182.60	182.52	182.40	182.41	182.40	182.47	182.14	182.38	182.32	182.45	182.45	182.45	182.60
Minimum	181.82	181.24	181.25	181.72	181.75	181.10	181.17	181.10	181.51	181.72	181.80	181.80	181.10
Pool Content EOM (1,000 AC. FT.)	46.9	46.3	47.1	46.6	46.0	45.5	45.5	47.5	47.4	46.8	46.9	46.6	

SUMMARY OF LAKE CONDITIONS FOR WATER YEAR 1980

ARKANSAS RIVER BASIN

LOCK AND DAM NO. 2	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Releases (1,000 AC. FT.)													
Avg 1970 thru 1980	1,521.7	2,925.2	2,918.3	2,501.8	2,299.7	4,360.2	4,701.1	3,987.8	3,848.6	1,818.8	781.8	1,952.2	33,617.2
WY 1980	299.9	1,342.4	1,885.5	1,085.2	1,301.4	1,846.0	3,789.5	3,283.7	2,032.7	817.8	354.1	358.0	18,396.2
Project Rainfall (inches)													
Avg 1971 thru 1980	3.4	5.7	5.1	5.7	3.9	7.5	5.0	5.9	4.6	3.1	3.2	4.0	57.1
WY 1980	3.3	7.7	3.7	4.2	2.4	12.5	4.8	7.5	2.3	1.9	0.5	8.9	59.7
Deviation	-0.1	+2.0	-1.4	-1.5	-1.5	+5.0	-0.2	+1.6	-2.3	-1.2	-2.7	+4.9	+2.6
Pool Elevation													
End of Month	162.24	161.75	162.12	162.02	162.22	161.87	161.86	162.23	162.24	162.87	162.96	162.29	
Maximum	162.44	162.36	162.38	162.37	162.36	162.48	162.06	162.42	162.43	163.06	163.08	163.08	163.08
Minimum	161.99	161.58	161.75	161.79	162.02	161.67	161.60	161.49	161.93	162.04	162.78	162.29	161.49
Pool Content EOM (1,000 AC. FT.)	112.8	107.4	111.4	110.3	112.5	108.7	108.6	112.7	112.8	119.8	120.8	113.3	

NORRELL LOCK NO. 1 (No basic data collected)

RED RIVER BASIN

ALTUS LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS(1000AC.FT.)													
AVG 1938 THRU 1965	9.22	2.67	4.23	4.09	5.32	5.24	9.36	30.86	26.31	9.95	3.13	3.42	113.8
FY 1980	.71	.79	1.49	3.49	4.52	4.38	6.35	28.25	4.00	.08	.37	.41	54.8
RELEASES(1000AC.FT.)													
AVG 1976 THRU 1980	.11	.17	.12	0.00	.29	1.22	1.00	35.00	11.44	17.81	13.59	1.00	82.5
FY 1980	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
RAINFALL(INCHES)													
AVG 1930 THRU 1977	2.06	.89	.79	.62	.82	1.14	2.02	3.93	3.22	2.22	2.57	2.34	22.62
FY 1980	1.38	.17	.01	.24	.10	.79	.89	3.03	.76	.61	.62	1.62	10.22
DEVIATION	-.68	-.72	-.78	-.38	-.72	-.35	-1.13	-.90	-2.46	-1.61	-1.95	-.72	-12.40
POOL ELEVATION													
END OF MONTH	1549.95	1549.92	1550.10	1550.71	1551.52	1552.10	1552.80	1557.49	1556.90	1547.49	1536.62	1534.39	
MAXIMUM	1550.48	1549.97	1550.10	1550.71	1551.52	1552.10	1552.80	1557.49	1557.85	1556.96	1547.49	1536.62	
MINIMUM	1549.87	1549.89	1549.88	1550.10	1550.70	1551.40	1552.10	1552.80	1556.90	1547.49	1536.62	1534.36	
POOL CONTENT-EOM													
(1000AC.FT)	85.34	85.20	86.04	88.91	92.83	95.69	99.24	125.33	121.81	74.85	36.38	30.41	

RED RIVER BASIN

(Tom Steed) MOUNTAIN PARK DAM	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS(1000AC.FT.)													
AVG 1926 THRU 1971	1.51	.33	.39	.17	.26	.42	1.07	4.13	3.56	1.24	.77	1.45	15.3
FY 1980	.52	1.83	.46	1.10	.11	.70	1.31	39.20	1.78	.06	.38	.39	47.8
RELEASES(1000AC.FT.)													
CONSERVATION POOL FILLED THIS FY													
FY 1980									10.87	0.00	0.00	0.00	
RAINFALL(INCHES)													
AVG 1930 THRU 1977	2.59	1.34	1.13	1.01	1.17	1.55	2.46	4.67	3.40	2.28	2.27	2.98	26.85
FY 1980	1.03	1.86	.64	1.57	.04	.40	.94	10.37	.81	.01	1.60	.87	20.14
DEVIATION	-1.56	.52	-.49	.56	-1.13	-1.15	-1.52	5.70	-2.59	-2.27	-.67	-2.11	-6.71
POOL ELEVATION													
END OF MONTH	1407.02	1407.12	1406.98	1407.01	1406.86	1406.66	1406.43	1412.80	1410.70	1409.61	1408.72	1408.08	
MAXIMUM	1407.58	1407.17	1407.12	1407.06	1407.01	1406.86	1406.66	1412.80	1412.81	1410.70	1409.61	1408.72	
MINIMUM	1406.96	1406.80	1406.93	1406.89	1406.86	1406.66	1406.40	1406.42	1410.70	1409.61	1408.72	1407.98	
POOL CONTENT-EOM													
(1000AC.FT)	65.74	66.29	65.52	65.68	64.89	63.84	62.63	100.91	87.09	80.40	75.20	71.56	

RED RIVER BASIN

LAKE KEMP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS(1000AC.FT.)													
AVG 1924 THRU 1969	24.65	5.99	7.93	3.65	5.93	7.30	12.74	40.22	26.79	17.23	20.99	29.27	202.7
FY 1980	.16	7.45	4.13	2.48	2.49	.20	1.90	51.77	8.25	.11	.61	17.27	96.8
RELEASES(1000AC.FT.)													
AVG 1976 THRU 1980	4.53	.77	3.29	0.00	.80	5.73	4.04	2.65	9.70	17.72	12.57	5.61	67.4
FY 1980	5.60	0.00	0.00	0.00	0.00	6.63	5.07	2.56	11.99	23.42	17.86	6.64	79.8
RAINFALL(INCHES)													
AVG 1930 THRU 1977	2.51	1.06	.97	.82	.99	1.10	1.94	3.56	2.70	2.01	2.15	2.88	22.69
FY 1980	.17	.49	.12	.14	.03	.09	.04	4.14	1.28	0.00	.31	3.41	10.22
DEVIATION	-2.34	-.57	-.85	-.68	-.96	-1.01	-1.90	.58	-1.42	-2.01	-1.84	.53	-12.47
POOL ELEVATION													
END OF MONTH	1132.17	1132.87	1133.25	1133.50	1133.77	1132.60	1131.59	1137.00	1135.64	1131.55	1127.99	1129.13	
MAXIMUM	1133.60	1132.92	1133.25	1133.53	1133.77	1133.77	1132.70	1137.00	1137.18	1135.64	1131.55	1129.16	
MINIMUM	1132.17	1132.03	1132.84	1133.22	1133.50	1132.60	1131.59	1131.25	1135.64	1131.55	1127.99	1126.23	
POOL CONTENT-EOM													
(1000AC.FT)	135.04	140.15	143.05	145.00	147.10	139.18	131.01	176.00	162.96	130.74	107.94	114.92	

RED RIVER BASIN

WAURIKA LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS(1000AC.FT.)													
AVG 1925 THRU 1974	7.99	3.48	3.20	1.76	3.79	5.40	7.98	25.23	17.20	3.40	1.71	4.30	85.4
FY 1980	.33	5.90	2.33	1.43	2.45	3.01	1.94	12.23	4.03	.25	.06	2.56	36.5
RELEASES(1000AC.FT.)													
LAKE HAS NOT FILLED													
RAINFALL(INCHES)													
AVG 1930 THRU 1977	3.05	1.76	1.47	1.29	1.47	1.93	2.78	5.11	3.56	2.37	2.38	3.34	30.51
FY 1980	.51	2.94	1.24	.71	.14	.40	1.39	5.37	1.41	.03	.69	3.51	18.34
DEVIATION	-2.54	1.18	-.23	-.58	-1.33	-1.53	-1.39	.26	-2.15	-2.34	-1.69	.17	-12.17
POOL ELEVATION													
END OF MONTH	942.31	942.80	942.85	942.93	943.08	943.04	942.82	943.97	943.76	942.83	941.90	941.62	
MAXIMUM	942.79	942.89	942.98	942.99	943.09	943.10	943.16	943.97	944.11	943.76	942.83	941.90	
MINIMUM	942.17	942.07	942.76	942.87	942.88	942.96	942.80	942.72	943.76	942.82	941.90	941.35	
POOL CONTENT-EOM													
(1000AC.FT)	122.32	126.00	126.60	126.97	129.10	127.80	126.15	134.77	133.20	126.22	119.31	117.38	

RED RIVER BASIN

FOSS RESERVOIR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS(1000AC.FT.)													
AVG 1926 THRU 1958	5.07	1.96	1.53	1.49	1.81	2.49	12.91	20.68	16.59	4.68	3.78	3.48	76.4
FY 1980	.46	.77	.16	2.01	2.32	4.13	4.25	20.24	11.30	.74	.31	.08	46.8
RELEASES(1000AC.FT.)													
AVG 1978 THRU 1980	3.94	.20	.18	.18	.74	.16	.15	1.23	8.93	2.03	.54	.26	18.5
FY 1980	.25	.24	.25	.25	.23	.25	.20	3.39	12.55	1.47	.76	.30	20.1
RAINFALL(INCHES)													
AVG 1930 THRU 1977	1.98	1.08	.76	.63	.88	1.26	2.29	4.05	3.14	2.00	2.49	2.27	22.83
FY 1980	2.29	.26	0.00	.26	.05	.50	1.55	5.39	1.32	.34	.66	1.19	13.81
DEVIATION	.31	-.82	-.76	-.37	-.83	-.76	-.74	1.34	-1.82	-1.66	-1.83	-1.08	-9.02
POOL ELEVATION													
END OF MONTH	1640.70	1640.58	1640.36	1640.50	1640.55	1640.74	1640.96	1643.05	1642.06	1640.97	1639.98	1639.33	
MAXIMUM	1641.20	1640.70	1640.58	1640.51	1640.56	1640.74	1640.96	1643.05	1643.40	1642.06	1640.97	1639.98	
MINIMUM	1640.65	1640.49	1640.33	1640.36	1640.50	1640.55	1640.74	1640.96	1642.02	1640.97	1639.98	1639.33	
POOL CONTENT-EOM (1000AC.FT)	169.27	168.50	167.07	167.98	168.30	169.53	170.96	185.15	178.31	171.02	164.61	160.51	

RED RIVER BASIN

FORT COBB RESERVOIR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS(1000AC.FT.)													
AVG 1926 THRU 1958	2.18	1.76	2.30	2.37	2.55	3.14	4.62	6.19	6.64	2.86	1.29	1.75	37.7
FY 1980	.47	1.06	.91	1.64	1.77	1.80	2.68	13.34	12.11	.16	.93	.18	37.0
RELEASES(1000AC.FT.)													
AVG 1976 THRU 1980	0.00	0.00	0.00	0.00	.20	0.00	0.00	.40	5.48	0.00	0.00	0.00	6.1
FY 1980	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.40	0.00	0.00	0.00	6.4
RAINFALL(INCHES)													
AVG 1930 THRU 1977	2.47	1.37	1.19	.99	1.11	1.60	2.63	4.62	3.25	2.37	2.50	3.17	27.27
FY 1980	2.24	2.43	1.07	1.31	.73	1.42	1.97	7.79	5.95	0.00	1.98	.84	27.73
DEVIATION	-.23	1.06	-.12	.32	-.38	-.18	-.66	3.17	2.70	-2.37	-.52	-2.33	.46
POOL ELEVATION													
END OF MONTH	1338.62	1339.52	1338.41	1338.46	1338.57	1338.56	1338.73	1341.64	1342.16	1340.99	1340.19	1339.40	
MAXIMUM	1339.33	1338.67	1338.53	1338.59	1338.64	1338.62	1338.80	1341.64	1343.78	1342.16	1340.99	1340.19	
MINIMUM	1338.60	1338.38	1338.30	1338.35	1338.46	1338.45	1338.35	1338.72	1341.39	1340.99	1340.19	1339.38	
POOL CONTENT-EOM (1000AC.FT)	66.91	66.55	66.15	66.33	66.73	66.69	67.31	78.56	80.67	75.94	72.82	69.81	

RED RIVER BASIN

ARBUCKLE RESERVOIR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS(1000AC.FT.)													
AVG 1926 THRU 1963	3.40	2.70	3.30	3.30	5.50	5.20	8.80	14.00	8.40	3.70	2.70	4.50	65.5
FY 1980	.54	.09	.13	.33	.69	.61	.38	7.67	3.57	.88	.86	1.92	16.1
RELEASES(1000AC.FT.)													
AVG 1976 THRU 1980	.17	.20	.18	.16	.12	1.28	3.10	5.63	8.14	.16	.16	.19	19.5
FY 1980	.06	.25	.14	.06	.06	.06	.06	.06	1.31	.06	.06	.06	2.3
RAINFALL(INCHES)													
AVG 1930 THRU 1977	3.16	2.32	2.10	1.76	2.21	2.90	3.95	5.55	3.86	2.57	2.84	3.80	37.02
FY 1980	2.10	.22	.73	.47	.27	.43	.38	4.97	2.42	.70	.91	8.99	22.59
DEVIATION	-1.06	-2.10	-1.37	-1.29	-1.94	-2.47	-3.57	-.58	-1.44	-1.87	-1.93	5.19	-14.43
POOL ELEVATION													
END OF MONTH	870.14	869.81	869.55	869.45	869.47	869.30	868.93	871.74	871.94	870.55	869.21	869.20	
MAXIMUM	870.62	870.14	869.81	869.55	869.54	869.47	869.30	871.74	872.53	871.94	870.55	869.21	
MINIMUM	870.14	869.81	869.53	869.44	869.43	869.30	868.91	868.76	871.35	870.55	869.21	868.49	
POOL CONTENT-EOM													
(1000AC.FT)	68.12	67.38	66.80	66.58	66.62	66.24	65.43	71.80	72.26	69.05	66.05	66.02	

RED RIVER BASIN

LAKE TEXOMA	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS(1000AC.FT.)													
AVG 1928 THRU 1978	274.37	187.93	142.53	124.95	183.17	240.24	358.25	792.18	596.41	204.88	113.70	208.05	3426.7
FY 1980	27.37	57.84	44.23	61.68	67.44	44.83	60.34	523.16	637.03	57.88	5.65	143.31	1730.8
RELEASES(1000AC.FT.)													
AVG 1976 THRU 1980	105.52	83.73	96.63	113.62	85.02	48.82	105.30	293.82	573.18	129.83	129.53	181.74	1866.7
FY 1980	105.71	58.20	39.50	81.98	115.48	62.58	56.79	70.32	548.81	160.83	139.42	80.63	1521.3
RAINFALL(INCHES)													
AVG 1930 THRU 1977	2.58	1.38	1.23	1.13	1.28	1.62	2.52	4.28	3.30	2.25	2.34	2.92	26.83
FY 1980	.78	.65	.49	.65	.25	.47	.67	4.92	1.54	.23	.72	4.01	15.38
DEVIATION	-1.80	-.73	-.74	-.48	-1.03	-1.15	-1.85	.64	-1.76	-2.02	-1.62	1.09	-11.45
POOL ELEVATION													
END OF MONTH	614.54	614.28	614.17	613.76	612.95	612.29	611.90	617.21	617.42	615.24	612.65	612.88	
MAXIMUM	616.02	614.54	614.35	614.26	614.01	612.95	612.46	617.21	619.30	617.44	615.24	612.88	
MINIMUM	614.36	613.90	614.10	613.75	612.92	612.28	611.89	611.82	617.21	615.24	612.65	611.11	
POOL CONTENT-EOM													
(1000AC.FT)	2440.92	2420.64	2412.06	2380.51	2318.88	2269.85	2241.05	2662.20	2681.10	2496.80	2296.59	2313.60	

RED RIVER BASIN

PAT MAYSE LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS(1000AC.FT.)													
AVG 1937 THRU 1965	3.26	6.19	5.71	7.14	12.51	10.72	16.31	16.77	10.73	3.95	1.85	3.16	98.3
FY 1980	1.92	.59	6.84	3.61	8.05	.69	2.19	6.97	3.25	.06	.13	11.82	46.1
RELEASES(1000AC.FT.)													
AVG 1976 THRU 1980	0.00	0.00	.43	.81	3.14	5.25	10.82	4.37	4.59	2.94	.72	0.00	33.1
FY 1980	0.00	0.00	0.00	.03	2.97	.90	.12	.72	1.26	.12	0.00	0.00	6.1
RAINFALL(INCHES)													
AVG 1930 THRU 1977	3.22	3.32	3.15	2.75	3.10	3.75	4.85	5.27	4.06	3.36	2.71	4.18	43.72
FY 1980	1.06	.66	.35	.58	.71	.37	.75	1.84	3.53	.88	.01	7.04	17.78
DEVIATION	-2.16	-2.66	-2.80	-2.17	-2.39	-3.38	-4.10	-3.43	-.53	-2.48	-2.70	2.86	-25.94
POOL ELEVATION													
END OF MONTH	449.85	449.62	450.63	450.93	451.44	451.03	450.89	451.45	451.23	450.23	449.32	450.70	
MAXIMUM	450.15	449.90	450.64	451.01	451.90	451.44	451.06	451.47	451.46	451.23	450.23	450.70	
MINIMUM	449.69	449.62	449.49	450.49	450.82	451.03	450.80	450.70	450.99	450.23	449.32	448.65	
POOL CONTENT-EOM													
(1000AC.FT)	117.73	116.40	122.32	124.09	127.18	124.68	123.85	127.24	125.90	119.96	114.65	122.73	

RED RIVER BASIN

HUGO LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS(1000AC.FT.)													
AVG 1926 THRU 1964	40.79	74.01	117.34	160.37	177.57	171.23	254.85	250.16	114.02	56.90	19.14	49.05	1485.4
FY 1980	14.31	21.55	55.34	55.98	96.98	24.37	126.69	254.66	57.34	2.78	1.91	68.60	780.5
RELEASES(1000AC.FT.)													
AVG 1976 THRU 1980	8.28	7.05	34.56	79.36	106.22	203.91	327.18	203.77	112.45	19.51	17.53	13.11	1132.9
FY 1980	8.30	19.95	48.98	62.61	97.59	17.10	99.42	245.87	73.52	18.14	17.65	13.00	722.1
RAINFALL(INCHES)													
AVG 1930 THRU 1977	3.67	3.76	3.20	2.89	3.30	3.92	5.12	5.99	4.33	3.61	3.42	4.55	47.76
FY 1980	2.58	.82	.95	.64	.76	1.01	1.29	5.07	2.51	1.51	.40	8.64	26.18
DEVIATION	-1.09	-2.94	-2.25	-2.25	-2.54	-2.91	-3.83	-.92	-1.82	-2.10	-3.02	4.09	-21.58
POOL ELEVATION													
END OF MONTH	404.55	404.60	405.30	404.68	404.46	404.70	406.38	406.49	404.95	403.17	401.25	405.39	
MAXIMUM	404.55	405.15	406.71	405.30	407.37	405.05	407.10	407.11	406.49	404.95	403.17	405.39	
MINIMUM	404.07	404.55	404.53	404.44	404.44	404.46	404.44	404.40	404.28	403.17	401.25	400.00	
POOL CONTENT-EOM													
(1000AC.FT)	158.22	158.90	168.38	159.98	157.01	160.25	183.52	185.15	163.62	140.51	117.77	169.60	

RED RIVER BASIN

PINE CREEK LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS(1000AC.FT.)													
AVG 1929 THRU 1973	21.89	37.76	59.17	64.45	81.41	81.35	99.21	108.20	39.88	18.91	8.56	19.28	639.1
FY 1980	4.61	6.83	43.81	30.93	55.64	10.17	61.72	102.68	27.34	1.11	.37	68.84	413.3
RELEASES(1000AC.FT.)													
AVG 1976 THRU 1980	3.30	3.99	22.43	40.46	39.65	91.86	109.02	74.82	41.52	6.00	5.99	3.97	443.0
FY 1980	4.00	3.87	37.57	31.39	53.42	7.62	51.97	84.41	46.63	5.60	5.33	4.58	336.4
RAINFALL(INCHES)													
AVG 1930 THRU 1977	3.80	3.90	3.59	3.17	3.52	4.25	5.24	6.12	4.36	3.91	3.66	4.63	50.15
FY 1980	2.16	.36	2.76	.85	1.24	.79	1.44	5.07	2.21	1.23	.02	10.73	28.86
DEVIATION	-1.64	-3.54	-.83	-2.32	-2.28	-3.46	-3.80	-1.05	-2.15	-2.68	-3.64	6.10	-21.29
POOL ELEVATION													
END OF MONTH	441.80	442.29	443.65	443.33	443.27	443.50	445.20	448.07	444.05	442.36	440.67	451.65	
MAXIMUM	441.95	442.39	447.74	445.10	448.34	443.78	446.30	448.27	448.17	444.05	442.36	451.65	
MINIMUM	440.96	441.80	442.20	443.33	443.27	443.27	443.49	443.24	443.27	442.36	440.67	439.58	
POOL CONTENT-EOM (1000AC.FT)	69.58	71.86	78.47	76.88	76.58	77.72	86.54	103.09	80.48	72.20	64.55	126.89	

RED RIVER BASIN

BROKEN BOW LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS(1000AC.FT.)													
AVG 1930 THRU 1978	33.70	57.90	92.11	112.65	115.23	140.07	130.09	131.16	48.14	25.09	13.96	23.21	923.3
FY 1980	12.20	18.53	141.06	59.58	73.64	41.06	90.34	128.48	34.69	1.09	.36	65.51	666.5
RELEASES(1000AC.FT.)													
AVG 1976 THRU 1980	27.06	24.81	49.33	74.30	57.08	73.21	131.24	66.39	89.02	44.82	28.85	15.85	682.0
FY 1980	36.02	15.80	84.35	121.53	115.37	54.96	13.94	40.28	105.40	69.29	33.23	25.26	715.4
RAINFALL(INCHES)													
AVG 1930 THRU 1977	4.20	4.08	4.12	3.76	3.85	4.86	5.32	6.15	4.38	4.25	3.82	4.53	53.32
FY 1980	3.07	1.08	4.05	1.28	1.27	1.16	2.45	5.04	3.05	3.41	.09	9.90	35.85
DEVIATION	-1.13	-3.00	-.07	-2.48	-2.58	-3.70	-2.87	-1.11	-1.33	-.84	-3.73	5.37	-17.47
POOL ELEVATION													
END OF MONTH	595.88	595.95	600.02	595.25	591.68	590.32	595.61	601.40	595.93	589.87	586.49	589.29	
MAXIMUM	597.92	596.14	602.94	600.02	595.25	591.68	595.62	601.40	601.51	595.93	589.87	589.29	
MINIMUM	595.11	595.55	595.69	595.25	591.68	588.18	590.32	595.61	595.93	589.85	586.49	584.09	
POOL CONTENT-EOM (1000AC.FT)	867.61	868.57	925.47	859.00	811.24	793.49	863.92	945.29	868.29	787.66	744.76	780.21	

RED RIVER BASIN

DEQUEEN LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS(1000AC.FT.)													
AVG 1930 THRU 1972	5.18	11.61	20.59	26.46	25.53	28.98	30.44	29.96	8.77	5.94	4.30	5.16	282.9
FY 1980	2.92	5.61	27.51	14.37	17.02	10.68	20.45	34.70	5.68	.62	.06	27.25	166.9
RELEASES(1000AC.FT.)													
AVG 1979 THRU 1980	.71	12.25	17.67	24.89	17.20	27.84	44.58	28.57	23.91	4.71	12.45	1.31	216.1
FY 1980	.75	5.08	22.41	17.32	17.08	7.94	22.16	25.62	12.86	1.84	1.84	1.20	136.1
RAINFALL(INCHES)													
AVG 1930 THRU 1977	3.88	4.20	4.29	4.02	3.96	4.92	5.44	6.23	4.23	4.25	3.45	4.31	53.18
FY 1980	4.28	2.04	3.59	1.31	1.32	2.68	3.80	7.50	2.87	3.01	.35	11.68	44.43
DEVIATION	.40	-2.16	-.70	-2.71	-2.64	-2.24	-1.64	1.27	-1.36	-1.24	-3.10	7.37	-8.75
POOL ELEVATION													
END OF MONTH	437.02	437.11	438.83	437.16	436.97	438.38	437.08	441.57	437.28	435.94	434.21	446.79	
MAXIMUM	437.02	438.38	445.31	439.58	442.01	438.58	440.56	441.70	441.57	437.28	435.94	446.79	
MINIMUM	435.60	437.02	437.05	437.07	436.72	436.86	436.96	436.83	436.88	435.94	434.21	433.38	
POOL CONTENT-EOM (1000AC.FT)	34.93	35.09	38.07	35.17	34.85	37.28	35.04	43.14	35.38	33.18	30.43	53.95	

RED RIVER BASIN

GILLHAM LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS(1000AC.FT.)													
AVG 1930 THRU 1973	10.66	21.77	37.86	49.81	45.39	52.03	50.21	52.10	16.30	10.33	8.33	9.45	361.2
FY 1980	3.07	10.31	42.25	26.79	25.98	23.26	37.57	58.87	5.45	.46	.17	16.97	251.2
RELEASES(1000AC.FT.)													
AVG 1977 THRU 1980	2.34	16.18	28.17	34.18	26.14	64.63	87.30	48.12	26.09	4.43	10.71	3.43	351.7
FY 1980	1.88	8.66	40.47	30.81	26.23	18.10	40.73	57.02	7.84	1.72	1.72	3.93	239.1
RAINFALL(INCHES)													
AVG 1930 THRU 1977	4.07	4.39	4.30	4.17	4.14	5.18	5.49	6.30	4.66	4.35	3.50	4.69	55.24
FY 1980	3.11	1.80	2.74	.93	.86	2.22	2.44	5.26	2.55	1.99	.42	9.80	34.12
DEVIATION	-.96	-2.59	-1.56	-3.24	-3.28	-2.96	-3.05	-1.04	-2.11	-2.36	-3.08	5.11	-21.12
POOL ELEVATION													
END OF MONTH	503.15	504.07	505.15	502.50	502.22	505.64	503.24	504.22	501.96	500.41	498.70	507.53	
MAXIMUM	503.15	504.40	515.94	506.78	509.44	505.81	506.42	514.79	504.45	501.96	500.41	507.98	
MINIMUM	501.69	502.23	501.91	501.26	501.85	501.89	501.84	501.90	501.82	500.41	498.70	497.47	
POOL CONTENT-EOM (1000AC.FT)	34.63	35.94	37.52	33.72	33.33	38.25	34.76	36.16	32.97	30.90	28.70	41.15	

RED RIVER BASIN

DIERKS LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS(1000AC.FT.)													
AVG 1930 THRU 1971	3.34	7.49	15.75	21.30	18.60	20.77	19.32	22.28	4.70	4.18	1.15	2.77	141.2
FY 1980	1.65	3.62	12.49	8.60	10.76	9.00	12.44	19.78	1.43	.28	.06	10.02	90.1
RELEASES(1000AC.FT.)													
AVG 1977 THRU 1980	.55	6.49	9.46	12.85	10.74	22.73	23.45	20.49	10.47	1.22	3.24	.78	122.5
FY 1980	.42	3.25	11.55	9.93	10.60	7.02	13.33	19.99	1.70	1.11	1.11	.80	79.8
RAINFALL(INCHES)													
AVG 1930 THRU 1977	3.51	4.48	4.38	4.22	4.27	5.13	5.45	5.16	4.54	4.04	3.25	3.90	53.33
FY 1980	4.00	1.82	3.48	1.85	1.67	3.20	3.16	5.06	2.32	1.35	.05	12.97	40.93
DEVIATION	.49	-2.66	-.90	-2.37	-2.60	-1.93	-2.29	-1.10	-2.22	-2.69	-3.20	9.07	-12.40
POOL ELEVATION													
END OF MONTH	526.27	525.36	526.70	525.92	525.95	527.17	526.20	526.44	525.82	524.32	522.69	529.81	
MAXIMUM	526.27	527.26	530.83	528.15	529.67	527.21	528.50	531.02	526.44	525.82	524.32	529.81	
MINIMUM	525.35	525.99	526.02	525.43	525.81	525.90	525.90	525.88	525.74	524.32	522.69	521.78	
POOL CONTENT-EOM (1000AC.FT)	30.02	30.15	30.62	29.54	29.58	31.27	29.93	30.26	29.41	27.42	25.37	35.16	

RED RIVER BASIN

MILLWOOD LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS(1000AC.FT.)													
AVG 1929 THRU 1968	101.92	200.82	347.68	481.33	509.07	576.35	650.28	731.12	244.51	120.72	67.58	95.26	4126.6
FY 1980	63.31	99.42	377.45	426.98	467.61	203.82	354.27	466.02	312.94	84.51	37.04	116.90	3010.3
RELEASES(1000AC.FT.)													
AVG 1976 THRU 1980	44.85	149.81	194.65	343.15	321.11	471.21	658.89	422.59	291.21	91.98	64.24	67.63	3121.3
FY 1980	45.98	109.87	273.82	522.39	458.86	185.67	354.36	428.92	313.42	66.43	25.56	143.40	2927.7
RAINFALL(INCHES)													
AVG 1930 THRU 1977	3.85	4.06	3.98	3.72	3.86	4.60	5.23	5.99	4.18	3.84	3.30	4.14	50.75
FY 1980	3.22	1.54	2.76	1.70	1.42	1.76	1.31	4.14	3.56	.93	.08	11.49	33.91
DEVIATION	-.63	-2.52	-1.22	-2.02	-2.44	-2.84	-3.92	-1.85	-.62	-2.91	-3.22	7.35	-16.84
POOL ELEVATION													
END OF MONTH	259.60	259.08	262.24	259.29	259.50	259.92	259.60	259.68	259.18	259.40	259.33	258.09	
MAXIMUM	259.74	259.77	263.00	262.24	262.31	260.03	261.27	260.44	260.13	259.69	259.77	259.33	
MINIMUM	259.20	259.08	259.09	259.17	259.20	259.18	259.17	259.14	259.14	259.09	259.17	254.92	
POOL CONTENT-EOM (1000AC.FT)	217.09	201.56	303.60	207.83	214.10	226.64	217.09	219.47	204.54	211.11	209.02	173.93	

RED RIVER BASIN

WRIGHT PATMAN LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS (1000 AC.FT.)													
AVG 1957 THRU 1980	64	166	234	177	242	269	305	423	159	62	19	42	2162
FY 1980	2	30	107	343	328	44	235	177	51	0	0	7	1324
RELEASES (1000 AC.FT.)													
AVG 1957 THRU 1980	106	140	201	222	229	247	215	282	223	145	53	51	2114
FY 1980	108	30	77	260	421	23	76	82	67	18	5	5	1172
RAINFALL (INCHES)													
AVG 1957 THRU 1977	3.68	3.29	3.65	2.47	3.06	3.93	4.87	4.44	4.25	3.40	2.67	4.86	44.57
FY 1980	3.51	1.61	3.95	4.33	1.86	2.30	4.17	4.59	3.92	1.00	0.68	7.61	39.53
DEVIATION	-0.17	-1.68	0.30	1.86	-1.20	-1.63	-0.70	0.15	-0.33	-2.40	-1.99	2.75	-5.04
POOL ELEVATION													
END OF MONTH	221.09	220.66	221.65	224.59	220.44	220.91	226.34	228.63	227.50	226.09	225.17	224.66	
MAXIMUM	225.68	221.09	221.65	224.59	224.68	220.96	227.20	230.01	228.58	227.50	226.09	225.17	
MINIMUM	221.05	220.60	220.54	220.56	220.44	220.44	220.91	225.57	222.42	226.09	225.17	224.24	
POOL CONTENT EOM (1000 AC.FT.)	168	159	181	257	154	164	309	386	347	301	273	259	

RED RIVER BASIN

LAKE O THE PINES	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS (1000 AC.FT.)													
AVG 1958 THRU 1980	9	27	50	58	62	81	87	64	26	10	6	15	495
FY 1980	12	28	48	102	72	54	114	86	19	0	0	5	540
RELEASES (1000 AC.FT.)													
AVG 1958 THRU 1980	10	16	47	55	59	76	64	61	30	16	10	15	459
FY 1980	40	28	42	27	144	41	98	66	9	2	2	1	500
RAINFALL (INCHES)													
AVG 1957 THRU 1977	3.07	3.53	3.69	2.59	3.16	3.73	4.90	4.01	3.73	2.79	2.33	3.93	41.46
FY 1980	3.28	2.32	3.65	5.65	2.21	3.71	5.61	4.98	3.18	1.49	1.22	4.81	42.11
DEVIATION	0.21	-1.21	-0.04	3.06	-0.95	-0.02	0.71	0.97	-0.55	-1.30	-1.11	0.88	0.65
POOL ELEVATION													
END OF MONTH	228.78	228.56	228.70	232.29	228.52	228.90	229.36	230.02	230.02	229.33	228.59	228.42	
MAXIMUM	230.57	228.90	229.13	232.30	232.29	229.25	229.54	230.50	230.22	230.02	229.33	228.59	
MINIMUM	228.40	228.54	228.50	228.53	228.52	228.50	228.56	228.70	229.95	229.23	228.59	228.21	
POOL CONTENT EOM (1000 AC.FT.)	260	256	259	331	255	262	271	284	284	271	257	253	

NECHES RIVER BASIN

SAM RAYBURN RESERVOIR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS (1000 AC.FT.)													
AVG 1908 THRU 1980	40	88	176	262	262	287	287	315	134	58	35	31	1975
FY 1980	64	147	241	311	363	317	487	568	38	1	0	6	2543
RELEASES (1000 AC.FT.)													
AVG 1965 THRU 1980	47	40	60	98	127	161	162	226	207	158	147	92	1525
FY 1980	43	8	109	98	195	183	379	270	456	197	150	113	2201
RAINFALL (INCHES)													
AVG 1931 THRU 1960	3.15	4.67	5.02	4.65	4.18	3.69	4.64	5.22	3.55	3.72	2.93	2.87	48.29
FY 1980	3.04	3.79	4.38	3.86	2.36	4.16	5.33	5.80	1.26	2.08	1.60	3.05	40.71
DEVIATION	-0.11	-0.88	-0.64	-0.79	-1.82	0.47	0.69	0.58	-2.29	-1.64	-1.33	0.18	-7.58
POOL ELEVATION													
END OF MONTH	158.76	159.90	161.02	162.86	164.16	165.03	165.60	167.67	163.60	161.22	159.07	157.58	
MAXIMUM	158.97	160.03	161.13	162.86	164.51	165.06	166.05	168.19	167.67	163.62	161.25	159.07	
MINIMUM	158.23	158.70	159.77	161.02	162.82	163.16	164.56	164.60	163.60	161.22	159.06	157.49	
POOL CONTENT EOM (1000 AC.FT.)	2295	2410	2527	2725	2871	2971	3038	3288	2807	2548	2327	2180	

NECHES RIVER BASIN

B.A. STEINHAGEN LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS (1000 AC.FT.)													
AVG 1908 THRU 1980	72	153	289	447	449	507	522	616	292	141	79	66	3633
FY 1980	141	145	349	369	583	469	710	741	544	226	161	122	4560
RELEASES (1000 AC.FT.)													
AVG 1951 THRU 1980	95	131	242	328	257	396	421	623	299	178	120	105	3195
FY 1980	144	116	358	360	591	448	723	741	524	215	164	116	4500
RAINFALL (INCHES)													
AVG 1931 THRU 1960	2.92	4.25	4.71	4.10	3.59	3.92	4.60	5.00	3.43	3.27	2.81	2.85	45.45
FY 1980	2.96	2.54	4.35	3.80	2.40	4.38	4.33	5.45	1.03	2.07	1.13	3.83	38.27
DEVIATION	0.04	-1.71	-0.36	-0.30	-1.19	0.46	-0.27	0.45	-2.40	-1.20	-1.68	0.98	-7.18
POOL ELEVATION													
END OF MONTH	80.16	82.49	81.67	82.31	81.53	82.95	81.60	81.14	82.26	82.62	81.87	82.00	
MAXIMUM	83.55	82.62	83.74	82.83	82.66	83.38	82.85	83.50	83.06	82.62	82.86	83.14	
MINIMUM	78.89	80.16	80.65	80.65	80.34	80.85	81.12	80.22	80.89	81.07	81.25	81.57	
POOL CONTENT EOM (1000 AC.FT.)	61	87	77	85	76	94	76	71	85	89	80	81	

TRINITY RIVER BASIN

BENBROOK LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS (1000 AC.FT.)													
AVG 1924 THRU 1980	2	2	2	3	6	7	9	14	5	1	1	2	54
FY 1980	1	0	3	4	5	4	8	10	2	1	0	3	41
RELEASES (1000 AC.FT.)													
AVG 1952 THRU 1980	1	2	2	2	4	5	5	11	10	1	1	1	45
FY 1980	0	0	0	0	4	2	7	4	4	2	1	3	27
RAINFALL (INCHES)													
AVG 1931 THRU 1960	2.83	2.22	2.30	2.06	2.06	2.36	3.79	4.75	3.28	2.16	2.10	2.44	32.35
FY 1980	3.17	0.59	3.79	2.31	1.10	1.43	3.03	4.73	0.12	0.30	1.06	6.70	28.33
DEVIATION	0.34	-1.63	1.49	0.25	-0.96	-0.93	-0.76	-0.02	-3.16	-1.86	-1.04	4.26	-4.02
POOL ELEVATION													
END OF MONTH	693.11	692.86	693.34	694.28	694.26	694.30	694.04	695.11	693.57	692.28	691.21	690.66	
MAXIMUM	693.45	693.11	693.35	694.30	694.28	694.49	694.86	695.48	695.11	693.57	692.28	691.21	
MINIMUM	693.01	692.86	692.80	693.34	693.97	693.93	694.03	694.04	693.57	692.28	691.21	690.08	
POOL CONTENT EOM (1000 AC.FT.)	85	84	86	89	89	89	88	92	87	82	78	76	

TRINITY RIVER BASIN

LEWISVILLE LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS (1000 AC.FT.)													
AVG 1924 THRU 1980	24	28	26	24	41	57	76	86	49	18	11	29	469
FY 1980	4	0	6	6	9	5	5	7	8	4	1	43	98
RELEASES (1000 AC.FT.)													
AVG 1954 THRU 1980	23	32	36	22	21	34	34	70	72	33	22	20	419
FY 1980	12	7	8	9	5	10	12	10	17	23	20	14	147
RAINFALL (INCHES)													
AVG 1931 THRU 1960	2.96	2.33	2.53	2.14	2.66	2.53	4.08	5.05	3.88	2.57	2.43	2.88	36.04
FY 1980	2.57	0.67	2.59	1.70	1.60	1.15	1.33	3.24	2.08	0.61	0.17	9.11	26.82
DEVIATION	-0.39	-1.66	0.06	-0.44	-1.06	-1.38	-2.75	-1.81	-1.80	-1.96	-2.26	6.23	-9.22
POOL ELEVATION													
END OF MONTH	510.34	509.66	509.36	508.98	508.98	508.27	507.39	506.70	505.23	502.75	500.27	501.85	
MAXIMUM	511.27	510.34	509.66	509.38	509.17	508.99	508.27	507.23	506.70	505.23	502.75	501.85	
MINIMUM	510.15	509.66	509.29	508.91	508.90	508.25	507.39	506.70	505.23	502.75	500.27	498.65	
POOL CONTENT EOM (1000 AC.FT.)	358	346	340	334	334	322	307	296	273	237	205	225	

TRINITY RIVER BASIN

GR/. .. LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS (1000 AC.FT.)													
AVG 1924 THRU 1980	6	6	7	9	13	16	24	27	14	5	2	6	135
FY 1980	2	0	2	2	2	2	2	3	2	1	0	4	22
RELEASES (1000 AC.FT.)													
AVG 1952 THRU 1980	5	4	8	6	5	5	10	12	14	10	8	5	92
FY 1980	6	5	6	5	4	2	2	2	3	5	5	4	49
RAINFALL (INCHES)													
AVG 1931 THRU 1960	3.13	2.19	2.24	1.90	2.26	2.26	3.89	4.46	3.28	2.56	2.48	2.78	33.43
FY 1980	2.13	0.53	3.06	1.83	1.67	1.04	1.32	3.34	1.14	0.65	0.18	7.88	24.77
DEVIATION	-1.00	-1.66	0.82	-0.07	-0.59	-1.22	-2.57	-1.12	-2.14	-1.91	-2.30	5.10	-8.66
POOL ELEVATION													
END OF MONTH	531.80	530.71	530.05	529.43	528.98	528.67	528.30	527.97	527.08	525.49	523.61	522.93	
MAXIMUM	532.84	531.80	530.71	530.05	529.43	528.98	528.67	528.34	527.96	527.08	525.49	523.61	
MINIMUM	531.68	530.71	530.05	529.46	528.96	528.61	528.29	527.97	527.08	525.49	523.61	522.09	
POOL CONTENT EOM (1000 AC.FT.)	159	151	147	143	140	138	136	134	129	120	110	106	

TRINITY RIVER BASIN

LAVON LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS (1000 AC.FT.)													
AVG 1924 THRU 1980	10	18	23	25	34	37	54	63	34	12	3	12	325
FY 1980	4	0	9	13	12	7	10	19	7	2	0	13	96
RELEASES (1000 AC.FT.)													
AVG 1953 THRU 1980	13	12	23	18	14	21	17	56	35	11	6	4	230
FY 1980	0	0	0	0	0	0	0	0	0	0	0	0	0
RAINFALL (INCHES)													
AVG 1931 THRU 1960	3.28	2.87	2.99	2.47	2.82	3.37	4.57	5.24	3.99	2.86	2.71	2.67	39.84
FY 1980	2.64	0.49	3.02	2.27	1.47	1.46	1.95	3.53	2.50	0.42	0.25	9.13	29.13
DEVIATION	-0.64	-2.38	0.03	-0.20	-1.35	-1.91	-2.62	-1.71	-1.49	-2.44	-2.46	6.46	-10.71
POOL ELEVATION													
END OF MONTH	489.32	488.71	488.64	488.81	488.90	488.53	488.21	488.31	487.39	485.87	484.28	483.81	
MAXIMUM	490.06	489.32	488.72	488.86	489.11	488.90	488.57	488.65	488.29	487.39	485.87	484.28	
MINIMUM	489.12	488.31	488.47	488.38	488.73	488.52	488.17	488.13	487.32	485.87	484.28	483.22	
POOL CONTENT EOM (1000 AC.FT.)	402	390	389	392	394	387	380	382	365	337	309	302	

TRINITY RIVER BASIN

NAVARRO MILLS LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS (1000 AC.FT.)													
AVG 1908 THRU 1980	5	6	8	10	10	12	19	30	14	4	1	3	122
FY 1980	1	0	11	17	10	6	50	48	1	0	1	1	146
RELEASES (1000 AC.FT.)													
AVG 1963 THRU 1980	2	8	7	5	6	8	9	18	21	7	0	2	93
FY 1980	0	0	2	15	9	4	36	52	4	0	0	0	122
RAINFALL (INCHES)													
AVG 1931 THRU 1960	2.64	2.60	2.61	2.62	2.80	2.67	4.36	4.98	3.50	1.82	1.60	2.64	34.84
FY 1980	3.25	0.64	3.94	2.93	1.21	2.42	6.57	5.67	0.29	0.44	0.48	3.71	31.55
DEVIATION	0.61	-1.96	1.33	0.31	-1.59	-0.25	2.21	0.69	-3.21	-1.38	-1.12	1.07	-3.29
POOL ELEVATION													
END OF MONTH	423.57	423.24	424.74	424.70	424.63	424.51	426.66	425.33	424.04	422.96	422.12	421.71	
MAXIMUM	423.87	423.57	424.97	427.18	425.78	425.13	428.21	430.39	425.26	424.04	422.96	422.12	
MINIMUM	423.27	423.24	423.04	424.42	424.44	424.49	424.50	424.44	424.03	422.96	422.00	421.50	
POOL CONTENT EOM (1000 AC.FT.)	52	51	58	58	58	57	68	61	55	49	46	44	

TRINITY RIVER BASIN

BARDWELL LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS (1000 AC.FT.)													
AVG 1938 THRU 1980	3	3	4	4	6	7	12	14	6	2	1	2	64
FY 1980	1	0	2	5	3	3	5	12	1	0	0	1	33
RELEASES (1000 AC.FT.)													
AVG 1965 THRU 1980	1	5	3	4	5	7	7	13	11	1	0	1	58
FY 1980	0	0	0	3	2	0	4	11	0	0	0	0	20
RAINFALL (INCHES)													
AVG 1931 THRU 1960	2.90	2.73	2.94	2.53	2.81	2.73	4.11	4.81	3.09	1.98	2.16	2.74	35.53
FY 1980	2.93	0.77	3.83	3.21	1.28	1.93	3.80	4.47	0.27	0.80	0.64	4.60	28.53
DEVIATION	0.03	-1.96	0.89	0.68	-1.53	-0.80	-0.31	-0.34	-2.82	-1.18	-1.52	1.86	-7.00
POOL ELEVATION													
END OF MONTH	420.48	420.30	420.73	420.98	421.02	421.20	421.08	420.98	420.48	419.65	418.82	418.53	
MAXIMUM	420.72	420.50	420.76	421.88	421.37	421.33	421.80	423.66	420.98	420.48	419.65	418.82	
MINIMUM	420.25	420.30	420.22	420.64	420.98	420.95	420.94	420.96	420.48	419.65	418.82	418.33	
POOL CONTENT EOM (1000 AC.FT.)	50	50	51	52	52	53	53	52	50	48	45	44	

SAN JACINTO BASIN

BARKER RESERVOIR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Inflows (1000 Ac. Ft.)													
Avg 1945 thru 1980	5.4	5.6	6.1	10.1	7.7	3.7	5.6	7.7	10.4	7.1	3.4	7.6	80.4
FY 1980	1.6	12.3	11.7	24.0	6.7	8.9	1.1	6.8	2.4	3.4	1.6	8.9	89.4
Releases (1000 Ac. Ft.)													
Avg 1964 thru 1976	7.0	7.3	4.5	5.8	7.8	5.8	4.1	10.2	11.4	7.0	4.0	8.0	82.9
FY 1980	24.3	13.5	11.7	13.0	16.5	1.8	8.2	6.9	2.4	3.4	1.6	8.9	112.2
Rainfall (Inches)													
Avg 1945 thru 1980	3.63	3.34	3.39	3.15	2.98	3.25	3.38	4.37	3.87	3.08	3.67	4.22	42.33
FY 1980	2.62	4.09	3.40	4.77	2.17	4.33	0.87	5.19	1.60	1.15	1.68	7.25	39.12
Pool Elevation													
End of Month	84.76	75.76	76.64	90.14	75.48	89.10	75.50	75.63	75.49	76.25	75.43	79.44	
Maximum	93.05	88.02	87.75	91.81	90.02	89.15	89.05	87.02	80.87	76.94	76.11	87.40	
Minimum	75.47	75.12	75.40	75.76	75.48	75.43	75.45	75.49	75.48	75.45	75.34	75.38	
Pool Content EOM (1000 Ac. Ft.)	0.87	0.01	0.01	10.38	0	7.31	0	0	0	0.01	0	0.01	

ADDICKS RESERVOIR	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Inflows (1000 Ac. Ft.)													
Avg 1948 thru 1980	5.7	5.5	6.4	6.6	7.2	3.2	6.0	7.3	7.3	5.0	4.7	6.3	71.2
FY 1980	3.9	13.7	10.1	19.6	8.8	7.5	2.5	5.6	1.4	1.2	0.8	3.9	79.0
Releases (1000 Ac. Ft.)													
Avg 1964 thru 1976	6.7	6.4	4.5	5.1	6.9	4.0	4.5	10.3	8.3	5.3	3.9	6.3	72.2
FY 1980	20.2	14.5	9.5	18.0	10.5	2.1	7.9	5.6	1.4	1.2	0.8	3.8	95.5
Rainfall (Inches)													
Avg 1945 thru 1980	3.86	3.35	3.49	3.08	3.21	2.15	3.52	4.07	3.73	3.11	3.20	4.48	41.25
FY 1980	2.61	4.65	3.37	4.86	2.22	4.38	1.22	3.57	1.71	2.11	1.31	7.05	39.06
Pool Elevation													
End of Month	87.21	74.68	74.33	89.80	73.43	92.71	73.44	73.51	73.30	73.57	73.34	80.10	
Maximum	96.48	90.71	90.27	95.20	89.66	92.74	92.68	89.32	78.70	74.87	74.45	85.90	
Minimum	73.44	73.40	73.40	73.37	73.43	73.44	73.43	73.42	73.29	73.26	73.33	73.34	
Pool Content EOM (1000 Ac. Ft.)	0.55	0	0	1.87	0	5.47	0	0	0	0	0	0.09	

BRAZOS RIVER BASIN

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
WHITNEY LAKE													
INFLOWS (1000 AC.FT.)													
AVG 1899 THRU 1980	108	67	68	56	61	68	138	277	162	97	73	111	1286
FY 1980	20	2	17	19	21	14	19	81	49	32	19	10	303
RELEASES (1000 AC.FT.)													
AVG 1951 THRU 1980	80	51	39	50	43	56	63	210	164	79	53	74	962
FY 1980	23	24	52	44	0	0	0	0	25	49	47	27	291
RAINFALL (INCHES)													
AVG 1931 THRU 1960	2.88	1.94	2.16	1.96	2.25	2.06	3.49	4.76	2.97	2.07	1.81	2.76	31.11
FY 1980	2.64	0.40	3.51	1.54	0.99	1.69	2.66	6.21	0.68	0.38	0.54	5.49	26.73
DEVIATION	-0.24	-1.54	1.35	-0.42	-1.26	-0.37	-0.83	1.45	-2.29	-1.69	-1.27	2.73	-4.38
POOL ELEVATION													
END OF MONTH	527.11	525.72	523.55	521.94	522.99	523.45	524.15	528.10	528.50	526.78	524.43	522.90	
MAXIMUM	527.66	527.12	525.72	523.65	523.04	523.55	524.19	528.10	529.78	528.50	526.79	524.43	
MINIMUM	526.70	525.72	523.55	521.70	521.94	522.88	523.45	524.13	528.18	526.74	524.33	522.64	
POOL CONTENT EOM (1000 AC.FT.)	500	474	437	410	427	435	447	519	527	493	451	426	

BRAZOS RIVER BASIN

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
WACO LAKE													
INFLOWS (1000 AC.FT.)													
AVG 1907 THRU 1980	25	16	21	18	25	26	48	71	30	14	8	17	319
FY 1980	3	1	8	11	14	10	15	56	7	1	0	4	130
RELEASES (1000 AC.FT.)													
AVG 1965 THRU 1980	10	15	15	18	22	31	40	82	26	16	4	6	285
FY 1980	0	0	0	4	11	2	13	49	1	0	0	0	80
RAINFALL (INCHES)													
AVG 1931 THRU 1960	2.58	2.19	2.50	2.26	2.39	2.09	3.83	4.83	2.88	2.14	1.67	3.00	32.36
FY 1980	2.07	0.37	3.43	2.20	1.21	2.09	2.66	5.91	1.23	0.54	0.66	5.85	28.22
DEVIATION	-0.51	-1.82	0.93	-0.06	-1.18	0.00	-1.17	1.08	-1.65	-1.60	-1.01	2.85	-4.14
POOL ELEVATION													
END OF MONTH	454.37	454.03	454.68	455.12	455.02	455.47	455.01	455.17	454.86	453.44	452.11	451.75	
MAXIMUM	454.78	454.37	454.86	455.45	455.83	455.59	455.53	456.45	455.15	454.86	453.44	452.11	
MINIMUM	454.26	454.03	453.90	454.68	454.95	454.96	454.95	454.95	454.86	453.44	452.11	451.34	
POOL CONTENT EOM (1000 AC.FT.)	145	142	147	150	149	153	149	150	148	138	[illegible]	126	

BRAZOS RIVER BASIN

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
PROCTOR LAKE													
INFLOWS (1000 AC.FT.)													
AVG 1962 THRU 1980	3	2	1	3	3	5	6	12	4	1	1	3	44
FY 1980	0	0	1	1	1	1	1	18	2	0	0	1	26
RELEASES (1000 AC.FT.)													
AVG 1963 THRU 1980	3	3	2	4	7	5	11	11	9	7	4	2	68
FY 1980	1	0	0	0	0	0	0	0	1	2	4	2	10
RAINFALL (INCHES)													
AVG 1931 THRU 1960	2.71	1.66	1.76	1.65	1.69	1.55	3.06	4.68	2.75	2.08	1.65	2.73	27.97
FY 1980	1.06	0.34	3.13	1.76	1.25	1.32	1.35	7.78	1.86	0.07	0.48	5.87	26.27
DEVIATION	-1.65	-1.32	1.37	0.11	-0.44	-0.23	-1.71	3.10	-0.89	-2.01	-1.17	3.14	-1.70
POOL ELEVATION													
END OF MONTH	1159.24	1158.85	1158.88	1158.86	1158.76	1158.46	1158.17	1162.00	1161.59	1160.12	1158.34	1157.58	
MAXIMUM	1159.98	1159.24	1158.93	1159.02	1158.96	1158.76	1159.03	1162.14	1161.99	1161.59	1160.12	1158.34	
MINIMUM	1159.13	1158.85	1158.68	1158.75	1158.74	1158.40	1158.10	1158.03	1161.44	1160.12	1158.27	1157.34	
POOL CONTENT EOM (1000 AC.FT.)	48	46	46	46	46	45	43	59	58	51	44	41	

BRAZOS RIVER BASIN

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
BELTON LAKE													
INFLOWS (1000 AC.FT.)													
AVG 1908 THRU 1980	32	21	31	32	36	38	66	105	47	24	14	26	472
FY 1980	1	0	8	6	10	10	16	142	15	6	1	4	219
RELEASES (1000 AC.FT.)													
AVG 1954 THRU 1980	26	25	21	28	28	40	35	63	71	45	14	9	405
FY 1980	2	1	2	2	1	1	1	110	34	19	3	2	178
RAINFALL (INCHES)													
AVG 1931 THRU 1960	2.61	2.11	2.28	2.10	2.21	1.96	3.56	4.66	2.89	2.07	1.69	2.92	31.06
FY 1980	1.71	0.27	3.52	2.12	1.25	1.85	2.25	7.22	1.74	0.44	0.30	6.41	29.08
DEVIATION	-0.90	-1.84	1.24	0.02	-0.96	-0.11	-1.31	2.56	-1.15	-1.63	-1.39	3.49	-1.98
POOL ELEVATION													
END OF MONTH	592.88	592.35	592.61	592.71	593.11	593.42	594.12	596.10	593.77	591.74	590.64	590.25	
MAXIMUM	593.45	592.88	592.65	592.75	593.25	593.52	594.12	600.36	596.06	593.77	591.74	590.64	
MINIMUM	592.60	592.35	592.12	592.50	592.60	593.04	593.42	594.12	593.77	591.74	590.63	590.14	
POOL CONTENT EOM (1000 AC.FT.)	428	422	425	426	431	435	443	469	439	415	402	397	

BRAZOS RIVER BASIN

STILLHOUSE HOLLOW LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS (1000 AC.FT.)													
AVG 1924 THRU 1980	14	10	13	16	22	23	27	47	19	11	5	11	218
FY 1980	1	0	3	2	4	4	6	76	10	0	0	2	108
RELEASES (1000 AC.FT.)													
AVG 1968 THRU 1980	8	8	11	14	14	18	23	38	26	21	4	7	192
FY 1980	0	0	0	0	2	0	3	59	32	11	0	0	107
RAINFALL (INCHES)													
AVG 1931 THRU 1960	2.78	2.16	2.33	2.02	2.13	1.84	3.35	4.42	2.99	1.98	1.92	3.11	31.03
FY 1980	1.52	0.36	3.38	1.32	1.37	1.90	2.66	7.44	1.41	0.24	0.33	5.66	27.59
DEVIATION	-1.26	-1.80	1.05	-0.70	-0.76	0.06	-0.69	3.02	-1.58	-1.74	-1.59	2.55	-3.44
POOL ELEVATION													
END OF MONTH	621.67	621.48	621.85	622.05	622.08	622.26	622.36	624.53	620.52	617.92	617.17	617.11	
MAXIMUM	621.94	621.67	621.86	622.06	622.22	622.37	622.36	628.78	624.44	620.52	617.92	617.26	
MINIMUM	621.59	621.48	621.44	621.85	621.93	622.00	621.89	622.33	620.52	617.92	617.17	617.06	
POOL CONTENT EOM (1000 AC.FT.)	234	232	235	236	236	237	238	252	226	210	206	206	

BRAZOS RIVER BASIN

NORTH FORK LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS (1000 AC.FT.)													
AVG 1980 THRU 1980	0	0	0	0	0	1	1	21	3	0	0	2	28
FY 1980	0	0	0	0	0	1	1	21	3	0	0	2	28
RELEASES (1000 AC.FT.)													
AVG 1980 THRU 1980	0	0	0	0	0	0	0	0	0	0	0	0	0
FY 1980	0	0	0	0	0	0	0	0	0	0	0	0	0
RAINFALL (INCHES)													
AVG 1931 THRU 1960	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FY 1980	1.23	0.71	2.87	1.40	2.29	2.69	2.80	7.41	0.64	0.14	0.93	5.42	28.53
DEVIATION	1.23	0.71	2.87	1.40	2.29	2.69	2.80	7.41	0.64	0.14	0.93	5.42	28.53
POOL ELEVATION													
END OF MONTH	722.70	722.50	722.60	722.50	721.00	731.57	734.77	776.96	779.19	778.30	777.44	779.12	
MAXIMUM	722.70	722.60	722.60	722.80	723.10	731.57	734.77	776.96	779.20	779.19	778.30	779.30	
MINIMUM	722.50	722.50	722.50	722.50	720.70	721.00	731.57	734.77	776.96	778.30	777.44	777.30	
POOL CONTENT EOM (1000 AC.FT.)	0	0	0	0	0	1	1	22	24	23	22	24	

BRAZOS RIVER BASIN

GRANGER LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS (1000 AC.FT.)													
AVG 1980 THRU 1980	0	0	0	3	7	7	6	18	3	0	0	2	46
FY 1980	0	0	0	3	7	7	6	18	3	0	0	2	46
RELEASES (1000 AC.FT.)													
AVG 1980 THRU 1980	0	0	0	0	0	0	1	1	0	0	0	0	2
FY 1980	0	0	0	0	0	0	1	1	0	0	0	0	2
RAINFALL (INCHES)													
AVG 1931 THRU 1960	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FY 1980	1.23	0.82	3.20	1.50	2.32	2.72	3.00	6.26	0.69	0.20	0.75	5.65	28.34
DEVIATION	1.23	0.82	3.20	1.50	2.32	2.72	3.00	6.26	0.69	0.20	0.75	5.65	28.34
POOL ELEVATION													
END OF MONTH	0.00	0.00	0.00	470.80	479.83	484.67	487.36	495.47	495.77	495.06	494.40	494.77	
MAXIMUM	0.00	0.00	0.00	470.80	479.83	484.67	487.36	495.48	495.90	495.17	495.06	494.77	
MINIMUM	0.00	0.00	0.00	459.30	470.80	479.83	484.67	487.36	495.50	495.06	494.40	494.22	
POOL CONTENT EOM (1000 AC.FT.)	0	0	0	2	9	15	19	36	37	35	33	34	

BRAZOS RIVER BASIN

SOMERVILLE LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS (1000 AC.FT.)													
AVG 1924 THRU 1980	13	15	18	22	24	20	29	37	21	12	3	10	224
FY 1980	0	1	7	23	11	24	9	41	2	0	0	2	120
RELEASES (1000 AC.FT.)													
AVG 1967 THRU 1980	12	11	16	11	20	18	25	35	34	23	6	6	217
FY 1980	0	0	0	14	10	1	23	28	20	10	1	0	107
RAINFALL (INCHES)													
AVG 1931 THRU 1960	2.66	3.10	3.15	2.89	2.87	2.44	3.71	3.95	3.43	2.35	2.45	3.09	36.09
FY 1980	1.72	1.38	3.33	3.45	1.73	3.96	2.17	5.57	0.68	0.58	0.15	3.63	28.35
DEVIATION	-0.94	-1.72	0.18	0.56	-1.14	1.52	-1.54	1.62	-2.75	-1.77	-2.30	0.54	-7.74
POOL ELEVATION													
END OF MONTH	237.18	237.06	237.57	238.14	238.04	239.68	238.05	238.75	236.52	234.83	233.89	233.67	
MAXIMUM	237.60	237.18	237.60	239.03	238.35	239.68	239.82	240.70	238.66	235.52	234.83	233.91	
MINIMUM	237.08	236.93	237.00	237.56	237.98	237.99	237.92	238.00	236.52	234.80	233.88	233.55	
POOL CONTENT EOM (1000 AC.FT.)	151	150	155	162	161	[illegible]	161	[illegible]	14[illegible]	12[illegible]	117	11[illegible]	

COLORADO RIVER BASIN

TWIN BUTTES LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS (1000 AC.FT.)													
AVG 1963 THRU 1980	7	4	3	3	3	3	5	9	3	2	8	10	60
FY 1980	2	1	4	3	3	2	2	16	4	1	1	17	56
RELEASES (1000 AC.FT.)													
AVG 1963 THRU 1980	1	1	1	1	1	1	2	3	2	2	1	1	17
FY 1980	3	2	1	1	1	2	4	4	4	12	8	2	44
RAINFALL (INCHES)													
AVG 1931 THRU 1960	1.81	0.76	0.91	0.89	0.83	0.83	1.74	2.89	1.83	1.74	1.45	2.37	18.05
FY 1980	0.55	0.04	2.43	0.78	0.59	0.28	0.40	3.71	1.95	0.21	2.56	7.09	20.59
DEVIATION	-1.26	-0.72	1.52	-0.11	-0.24	-0.55	-1.34	0.82	0.12	-1.53	1.11	4.72	2.54
POOL ELEVATION													
END OF MONTH	1924.57	1923.93	1924.27	1924.55	1924.60	1923.98	1922.57	1924.76	1924.01	1919.99	1917.03	1921.29	
MAXIMUM	1925.55	1924.53	1924.27	1924.56	1924.70	1924.60	1923.98	1924.98	1924.75	1923.92	1919.87	1921.29	
MINIMUM	1924.57	1923.93	1923.85	1924.29	1924.55	1923.98	1922.57	1921.60	1924.01	1919.99	1917.03	1916.31	
POOL CONTENT EOM (1000 AC.FT.)	84	81	83	84	84	81	76	84	81	67	58	72	

COLORADO RIVER BASIN

O.C.FISHER LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS (1000 AC.FT.)													
AVG 1953 THRU 1980	4	0	0	0	1	1	4	6	3	3	1	8	31
FY 1980	0	0	0	0	0	0	0	1	0	0	4	19	24
.LEASES (1000 AC.FT.)													
AVG 1953 THRU 1980	2	0	0	0	0	0	0	0	0	1	1	0	4
FY 1980	0	0	0	0	0	0	0	0	0	0	0	0	0
RAINFALL (INCHES)													
AVG 1931 THRU 1960	1.88	0.75	1.04	0.84	0.84	0.86	1.59	2.71	1.91	2.09	1.65	2.18	18.34
FY 1980	0.62	0.11	2.27	0.65	0.50	0.23	0.49	3.57	2.65	0.20	2.36	9.62	23.27
DEVIATION	-1.26	-0.64	1.23	-0.19	-0.34	-0.63	-1.10	0.86	0.74	-1.89	0.71	7.44	4.93
POOL ELEVATION													
END OF MONTH	1876.41	1875.97	1875.97	1875.82	1875.71	1875.42	1874.88	1874.83	1874.26	1873.22	1875.47	1885.46	
MAXIMUM	1877.09	1876.41	1875.99	1875.98	1875.86	1875.71	1875.42	1875.08	1874.82	1874.29	1875.95	1885.46	
MINIMUM	1876.41	1875.97	1875.86	1875.82	1875.71	1875.39	1874.88	1874.83	1874.26	1873.22	1872.75	1875.24	
POOL CONTENT EOM (1000 AC.FT.)	18	17	17	17	17	16	16	16	15	14	16	35	

COLORADO RIVER BASIN

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
HORDS CREEK LAKE													
INFLOWS (1000 AC.FT.)													
AVG 1942 THRU 1980	0	0	0	0	0	0	1	1	0	0	0	0	2
FY 1980	0	0	0	0	0	0	0	1	0	0	0	1	2
RELEASES (1000 AC.FT.)													
AVG 1953 THRU 1980	0	0	0	0	0	0	0	0	0	0	0	0	0
FY 1980	0	0	0	0	0	0	0	0	0	0	0	0	0
RAINFALL (INCHES)													
AVG 1931 THRU 1960	2.49	1.31	1.44	1.56	1.29	1.25	2.90	4.49	2.73	2.38	1.94	3.04	26.82
FY 1980	0.26	0.17	3.17	1.96	1.32	1.23	0.83	5.87	2.35	0.00	2.22	10.76	30.14
DEVIATION	-2.23	-1.14	1.73	0.40	0.03	-0.02	-2.07	1.38	-0.38	-2.38	0.28	7.72	3.32
POOL ELEVATION													
END OF MONTH	1884.10	1883.56	1883.57	1883.45	1883.28	1882.84	1882.15	1885.42	1885.14	1883.68	1882.79	1886.48	
MAXIMUM	1884.93	1884.10	1883.59	1883.57	1883.46	1883.28	1882.84	1885.45	1885.42	1885.14	1883.68	1886.48	
MINIMUM	1884.10	1883.56	1883.41	1883.41	1883.28	1882.82	1882.15	1882.10	1884.88	1883.68	1882.68	1882.53	
POOL CONTENT EOM (1000 AC.FT.)	3	3	3	3	2	2	2	3	3	3	2	3	

COLORADO RIVER BASIN

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
MARSHALL FORD													
INFLOWS (1000 AC.FT.)													
AVG 1941 THRU 1980	123	64	53	79	83	85	127	243	154	95	88	112	1306
FY 1980	6	15	15	17	19	21	61	140	96	46	38	309	783
RELEASES (1000 AC.FT.)													
AVG 1944 THRU 1980	35	33	26	25	28	36	51	91	87	66	57	40	575
FY 1980	11	2	2	1	16	16	74	71	143	123	130	96	685
RAINFALL (INCHES)													
AVG 1931 THRU 1960	2.39	1.46	1.42	1.13	1.18	1.27	2.46	3.27	2.50	2.02	2.03	2.76	23.89
FY 1980	0.53	0.45	2.62	1.06	0.94	1.23	1.17	5.46	2.25	0.24	1.24	9.22	26.41
DEVIATION	-1.86	-1.01	1.20	-0.07	-0.24	-0.04	-1.29	2.19	-0.25	-1.78	-0.79	6.46	2.52
POOL ELEVATION													
END OF MONTH	671.69	672.22	672.80	673.60	673.55	673.55	672.33	675.89	672.55	667.12	660.45	673.54	
MAXIMUM	672.41	672.33	672.80	673.60	674.29	673.55	673.55	676.22	675.85	672.57	667.10	673.54	
MINIMUM	671.60	671.59	672.12	672.74	673.55	673.01	672.32	672.36	672.55	667.12	660.45	658.42	
POOL CONTENT EOM (1000 AC.FT.)	1006	1015	1024	1038	1037	1037	1016	1078	1020	932	831	1037	

GUADALUPE RIVER BASIN

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
CANYON LAKE													
INFLOWS (1000 AC.FT.)													
AVG 1965 THRU 1980	25	16	17	20	21	23	31	40	28	21	18	27	287
FY 1980	9	9	13	12	11	13	12	22	10	4	3	32	150
RELEASES (1000 AC.FT.)													
AVG 1964 THRU 1980	15	16	11	14	18	18	21	25	26	20	27	17	228
FY 1980	6	5	6	6	7	10	10	13	19	8	3	14	107
RAINFALL (INCHES)													
AVG 1931 THRU 1960	3.05	1.67	2.18	2.07	2.20	2.00	3.00	4.03	2.98	2.40	2.07	4.02	31.67
FY 1980	0.54	1.70	2.32	1.28	1.04	2.50	1.74	4.63	1.04	0.54	2.50	8.10	27.93
DEVIATION	-2.51	0.03	0.14	-0.79	-1.16	0.50	-1.26	0.60	-1.94	-1.86	0.43	4.08	-3.74
POOL ELEVATION													
END OF MONTH	904.77	904.99	905.73	906.35	906.56	906.55	906.39	907.23	905.47	904.17	903.63	905.53	
MAXIMUM	904.81	905.02	905.73	906.40	906.66	906.55	906.62	907.41	907.21	905.47	904.17	905.71	
MINIMUM	904.67	904.74	904.99	905.73	906.34	906.20	906.32	906.30	905.47	904.17	903.63	903.54	
POOL CONTENT EOM (1000 AC.FT.)	348	350	356	361	362	362	361	368	354	343	339	354	

RIO GRANDE BASIN

PLATORO DAM[1]

PLATORO DAM[1]	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Inflows (1000 Ac. Ft.)													
Avg 19 thru 19													
FY 1980	.5							10.6	48.0	17.5	3.8	1.9	
Releases (1000 Ac. Ft.)													
Avg 19 thru 19													
FY 1980	.5							16.9	19.7	22.9	10.5	1.5	
Rainfall (Inches)													
Avg 19 thru 19													
FY 1980	.96							1.56	.02	.68	1.37	1.33	
Pool Elevation (EOM)	9999.30							972.20	10014.40	10007.30	9982.40	9982.30	
Maximum	9999.40							9979.60	10014.40	10015.50	10006.40	9982.3	
Minimum	9999.30							9971.70	9971/70	10007.30	9982.3	9982.3	
Pool Content (EOM) (1000 Ac. Ft.)	30.5							14.2	42.0	36.4	19.7	19.6	

1 Data for compiling averages unavailable.

ABIQUIU DAM

ABIQUIU DAM	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Inflows (1000 Ac. Ft.)													
Avg 1962 thru 1980	8.9	15.7	18.2	6.3	6.6	15.0	45.2	91.2	45.8	21.6	22.9	14.6	312.0
FY 1980	30.4	5.1	55.4	5.5	13.9	16.4	88.4	213.1	127.1	30.4	26.0	21.8	633.5
Releases													
Avg 1963 thru 1980	9.9	23.5	22.8	8.7	6.0	13.8	34.9	58.7	50.9	31.5	23.1	14.2	298.0
FY 1980	34.9	71.0	57.4	44.6	12.4	19.6	68.1	104.9	128.1	57.5	25.9	21.4	645.8
Rainfall (Inches)													
Avg 1957 thru 1980	.90	.57	.37	.34	.27	.52	.50	.69	.61	1.61	1.96	1.07	9.41
FY 1980	.96	.38	.16	.28	.19	.86	1.24	1.14	0	1.00	1.92	.86	8.99
Pool Elevation (EOM)	6194.61	6166.71	6165.51	6167.10	6167.97	6166.13	6176.58	6212.37	6211.34	6203.21	6202.67	6202.35	
Maximum	6196.76	6193.94	6166.30	6167.50	6169.42	6167.62	6176.58	6212.37	6219.63	6210.63	6203.19	6202.79	6219.63
Minimum	6194.69	6166.71	6165.15	6165.42	6166.33	6166.09	6166.00	6177.53	6211.34	6203.05	6202.61	6202.34	6165.15
Pool Content (EOM) (1000 Ac. Ft.)	111.7	45.7	43.7	44.7	46.2	43.1	63.0	69.6	165.7	136.3	134.5	133.4	1037.6

RIO GRANDE BASIN

COCHITI LAKE	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Inflows (1000 Ac. Ft.)													
Avg 1910 thru 1980	48.7	52.3	47.6	126.5	256.2	190.4	86.4	70.6	199.7	83.7	55.2	43.1	1260.4
Fy 1980	41.9	89.6	88.8	43.5	56.0	64.1	145.0	391.9	356.2	124.6	48.7	32.6	1482.8
Releases (1000 Ac. Ft.)													
Avg 1975 thru 1980	29.9	47.6	49.9	37.8	37.2	60.8	105.5	223.2	204.5	133.7	50.7	39.1	1019.9
FY 1980	42.0	89.4	88.9	13.2	56.2	64.1	137.5	380.4	372.6	124.2	480.6	32.0	1478.6
Rainfall (Inches)													
Avg 1967 thru 1980	.96	.64	.59	.62	.29	.51	.48	.92	.75	1.90	2.51	1.47	116.40
FY 1980	.36	.96	.42	.95	.61	.25	.54	.90	.12	.21	1.07	1.55	7.94
Pool Elevation (EOM)	5321.40	5321.45	5321.41	5322.61	5321.59	5321.56	5321.78	5335.33	5322.13	5321.56	5321.42	5321.39	
Maximum	5321.81	5321.81	5322.21	5321.66	5321.65	5322.77	5329.06	5339.99	5339.72	5321.72	5322.02	5321.97	5339.99
Minimum	5320.25	5321.19	5321.41	5321.40	5321.43	5321.30	5321.43	5327.76	5322.13	5320.89	5321.29	5321.24	5320.25
Pool Content (EOM) (1000 Ac. Ft.)	46.2	46.2	46.2	46.4	46.4	46.4	54.2	64.7	47.0	46.4	46.2	46.1	582.4

GALISTEO DAM	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Inflows (1000 Ac. Ft.)*													
Avg 1971 thru 1980													
FY 1980													
Releases (1000 Ac. Ft.)													
Avg 1971 thru 1980	.34	.07	.07	.08	.11	.12	.19	.14	.14	1.63	1.02	.7	.4
FY 1980	0	0	0	.02	.2	.2	.2	.2	.1	.03	.2	.2	1.4
Rainfall (Inches)													
Avg 1958 thru 1980	.82	.56	.26	.49	.37	.35	.51	1.03	.32	1.35	1.41	1.24	8.71
FY 1980	.34	1.10	0	1.08	.38	.27	.49	1.60	0	.08	1.55	1.41	8.30
Pool Elevation (EOM)**													
Maximum	EMPTY ALL YEAR												
Minimum													
Pool Content (EOM) (1000 Ac. Ft.)	0	0	0	0	0	0	0	0	0	0	0	0	0

* Inflow = Outflow
** Invert Elevation

RIO GRANDE BASIN

Jemez Canyon Dam	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
INFLOWS (1000 Ac. Ft.)													
Avg 1953 thru 1980	1.9	1.9	1.4	1.5	1.7	3.5	12.5	10.6	2.4	1.1	3.0	1.0	42.5
FY1980	.4	1.5	1.3	1.7	1.8	2.2	20.5	34.0	6.0	.2	.2	.4	70.2
Releases (1000 Ac. Ft.)													
Avg 1954 thru 1980	1.7	1.9	1.4	1.5	2.5	3.4	9.5	11.6	5.8	1.3	2.9	1.0	44.5
FY1980	.2	1.5	1.2	1.8	1.8	2.1	16.8	35.9	6.9	.3	.1	1.5	70.1
Rainfall (Inches)													
Avg 1953 thru 1980	.97	.43	.41	.40	.36	.47	.35	.73	.44	1.21	1.57	1.00	8.34
FY1980	.47	1.45	.40	.94	.82	.18	.16	.72	.11	.63	1.57	1.75	9.20
Pool Elevation (EOM)	5160.16	5159.98	5151.89	5159.77	5159.87	5160.21	5168.99	5164.08	5760.64	5159.51	5159.21	5158.53	
Maximum	5160.16	5161.10	5160.25	5160.23	5160.55	5160.26	5171.25	5171.10	5163.83	5160.60	5159.64	5159.67	5171.25
Minimum	5159.44	5159.38	5159.47	5159.57	5159.76	5159.17	5160.10	5164.08	5160.43	5159.51	5159.21	5158.53	5158.53
Pool Content (EOM) (1000 Ac. Ft.)	2.0	2.0	2.0	1.9	1.9	2.0	5.6	3.3	2.2	1.8	1.8	1.6	28.1

Los Esteros Lake	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Inflow (1000 Ac. Ft.)							2.7	14.8	11.9	3.9	-	2.9	36.2
Avg*													
FY 1980													
Releases (1000 Ac. Ft.)													
Avg													
FY 1980							.1	.4	1.2	30.3	-	2.3	34.3
Rainfall (Inches)													
Avg													
FY 1980								.38	0	.40	6.33	2.96	10.7
Pool Elevation (EOM)							4671.40	4706.31	4715.18	4630.00	4630.00	4671.70	
Maximum							4671.40	4706.31	4715.83	4715.04	4630.00	4671.70	4671.70
Minimum							4630.00	4172.19	4706.81	4630.00	4630.00	4630.00	4630.00
Pool Content (EOM) (1000 Ac. Ft.)							2.5	16.9	27.3	0	0	2.5	49.2

*Insufficient data for averages storage started in April 1980

SUMNER LAKE

RIO GRANDE BASIN
NO DATA AVAILABLE

Two Rivers Dam	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Inflow (1000 Ac. Ft.)	.5	.6	.3	.4	.2	.2	.5	.6	.7	.6	1.2	1.8	4.9
Avg 1964 thru 1980	0	0	0	0	0	0	0	0	0	0	.7	4.0	4.7
FY 1980													
Releases (1000 Ac. Ft.)*													
Avg 19 thru 19													
FY 1980													
Rainfall (Inches)													
Avg 1975 thru 1980	.90	.19	.19	.22	.41	.29	.33	.68	1.33	1.94	2.89	2.18	11.49
FY 1980	0	0	0	0	0	0	0	1.13	0	.12	3.23	5.75	10.23
Pool Elevation (EOM)	Empty	Empty	Empty	Empty	Empty	Empty	Empty	Empty	Empty	Empty	Empty	Empty	
Maximum												3983.75	3983.75
Minimum												Empty	Empty
Pool Content (EOM) (1000 Ac. Ft.)	0	0	0	0	0	0	0	0	0	0	0	0	0

*Inflow = Outflow

SECTION VIII - MINUTES OF MEETINGS OF BASIN INTERESTS GROUPS

1. Arkansas River Basin Coordinating Committee
2. Trinity River Basin Water Management Intersts Group

MINUTES

Arkansas River Basin
Coordinating Committee Meeting
16 April 1980

1. Introduction. Mr. R. Terry Coomes, Chairman of the Committee, opened the meeting and introduced those in attendance. A list of attendees is furnished on inclosure 1. The primary purpose of this meeting is to provide an opportunity to coordinate the water control activities in the Arkansas River Basin with the state and Federal agencies. The annual report provides a review of the activities and, in a number of instances, provides a preview of activities for the coming year.

2. Review of 1979 Operations.

a. Above Fort Smith. Mr. Ross R. Copley, Corps of Engineers, Tulsa District, reviewed the operations above Fort Smith. Generally, the flows for the basin were below normal. Flows past the Van Buren gage were below normal. However, there were some good runoff producing storms in March, May, June, and November. At Fort Supply, the pool reached it's highest since 1957. Chaney Lake (Bureau of Reclamation) reached it's highest pool level of record. We ran several navigation tapers during the flood season and these were very successful. The seasonal pool operations at the Kansas lakes were continued. This is for fish and wildlife benefits. Last year over 20 million dollars of flood damage were prevented. The tonnage on the navigation system was down slightly from 1978. The power production was up compared to the 5-year average. Recreation attendance at the lakes was down slightly. This decrease in attendance was primarily due to effects of the energy shortage. The water supply uses were up about 29 percent from 1978. The Tulsa District completed detailed water quality studies on Fort Gibson, Tenkiller, and Kaw. Also, detailed studies were initiated on Oologah, Fall River, Elk City, Birch, Heyburn, and Hula. The final report on these is expected in September of 1980.

The status of projects under construction is as follows:

Project	Diversion through Outlet Works Schedule	Impoundment Schedule
Big Hill	Jun 80	Jun 81
Copan	Jul 80	Jul 82
El Dorado	Apr 80	Dec 80
Skiatook	Jun 81	Oct 82

Candy - this project is on hold until Congress makes a decision concerning a claim on the mineral rights.

b. Below Fort Smith. Mr. William E. Isaacs, Corps of Engineers, Little Rock District, reviewed the operations below Fort Smith. Above normal rainfall occurred at the two tributary projects and along the Arkansas River below Fort Smith. The rainfall at Fort Smith was over 7-1/2 inches above normal and at Little Rock was over 4 inches above. However, there were not any major floods. The regulation plan and navigation taper worked real well and navigation was able to get the necessary dredging done without any problems. Arkansas reported 2.43 million pounds of commercial fish caught in the Arkansas River with a value of $830,000. Blue Mountain Lake prevented over 1 million dollars in flood damages and Nimrod Lake prevented $757,000 worth of damages, and there was $2,930,000 of flood damages prevented along the main stem of the Arkansas River (upstream reservoirs and levees). There was some decrease in the navigation tonnage, and it is felt that this was primarily due to the economy. Flows on the river were generally good for support of navigation traffic. Maintenance dredging was about 0.4 million cubic yards less than 1978. There were a few minor navigation accidents but no major damage was experienced. 1979 was the best year for hydropower production since 1975.

The Little Rock District had a lake and shore cleanup in September that was highly successful. Hopefully, this will become an annual event. It was also noted that, in general, the lake attendance was not down for the projects below Fort Smith.

3. Occurrence and Effects of PCB Contamination. Mr. David L. Olschewsky, Environmental Protection Agency (EPA), Region 6, Dallas, Texas, presented a discussion on polychlorinated biphenyls (PCB's). PCB's are produced by the clorination of a biphenyl molecule with annydrous chlorine. Almost all PCB's in existence today have been synthetically manufactured. Production began about 1929. PCB's are generally heavy liquid, oil-like substances and weigh about 10-12 pounds per gallon. The primary use of PCB's has been in electrical transformers, capacitors, heat transfer systems, and hydraulic systems. Other uses include paints, adhesives, caulking compounds, lubricants, inks, carbonless copy paper, coatings, and dust control agents.

It is estimated that 20 percent of all PCB's that have been produced are still in service. Five percent have been vaporized but not destroyed by burning, ten to fifteen percent have been discharged in fresh or coastal waters, fifty-five percent disposed in dumps and incinerators, ten to twenty percent being destroyed by incinerators. Low temperature incineration can create a contaminant more toxic than PCB, Dibenzo-Furans. Once PCB's are released into the environment, they are very stable and accumulate in organisms throughout the environment.

There are tests which show PCB's cause, among other things, reproductive failures, gastric disorders, skin lesions, and tumors in laboratory animals. Workers exposed to PCB's have shown a number of symptons and adverse effects including, but not limited to, chloracne and other epidermal disorders, digestive disturbances, jaundice, impotence, throat and respiratory irritations, and severe headaches.

EPA now has a regulation requiring the disposal of PCB's in an EPA approved chemical disposal site or by high temperature incinerators.

Additional information is contained in a booklet distributed at the meeting entitled "EPA's Final PCB Ban Rule: Over 100 Questions and Answers to Help You Meet these Requirements," dated June 1979.

4. Status and Impacts of PCB at Fort Gibson Lake. Mr. Richard G. Hunter, Corps of Engineers, Tulsa District, stated the reason for studying the lake was the proposal to add additional hydropower facilities and addition of municipal water supply. Therefore, a water study was required to see if the project was suitable for municipal water supply. Therefore, the District prepared a water quality study and also looked at the fish to determine if any toxic substances were present. The findings were that the water is of excellent quality and most contaminants in the fish were low. However, the PCB's were discovered in the fish--primarily in the types that feed on the bottom. The amount of contamination was generally low except for fish taken out of Pryor Creek. The primary area of contamination appears to be in the Pryor Creek area with the contaminants coming from a part of the Pryor Creek industrial park.

After this PCB contamination was discovered, other state and Federal agencies which have an interest in water quality were notified.

Additional sediment samples were taken to determine the areas of contamination. After these were mapped methods of disposing of this material were explored. One thought was to dredge out the hot spots. However, it was decided the concentrations were not such that dredging would be feasible.

During 1979, the tourist industry in the area projected that they lost about 34 million dollars due to the PCB problem.

5. Instream Flow Activities. Mr. David R. Brown, Corps of Engineers, Southwestern Division (SWD), presented a discussion of the instream flow requirements. In a June 1978 message to Congress, President Carter expressed concern for protecting the nation's instream flow. A month later a memorandum was issued to Federal agency heads to provide increased cooperation with the states and leadership to protect groundwater, to improve, where possible, operation of existing water resources projects and of future dams and other facilities to protect instream uses. He asked that Federal agencies, working in cooperation with the states, set a strong example in recognizing and protecting instream flow needs.

A task force consisting of representatives of several Federal agencies was established and charged with setting guidelines for determining instream flow needs. At the present, they have only addressed the physical conditions. One of the major problems being encountered is trying to develop general guidelines that can be applied to many different geographic areas and the many varied purposes the water resources projects have to serve such as flood control, navigation, hydropower, recreation, water supply, etc. Instream flow uses are defined as all beneficial uses of water in the stream channel. The definition of instream-flow requirements is "the flow regime necessary for

all of the individual and collective instream uses of water, including an acceptable range of water quality." There are four general categories in the instream flow problems: (1) quantity, (2) quality, (3) physical barriors, and (4) flow fluctuations. The problems can be a combination of any or all of these categories.

We will soon be getting started on a project-by-project evaluation of all existing Corps projects. This will be used to assess the magnitude of existing instream-flow related problems and needs and will serve as a basis for establishing priorities for meeting these needs. Evaluations of all projects must be completed and submitted to OCE as part of the Annual Division Water Quality Reports by 1 February 1981.

6. Report on Oklahoma Comprehensive Water Plan. Mr. Mike Melton, Oklahoma Water Resources Board, presented a summary of the Oklahoma Comprehensive Water Plan. Mr. Melton distributed copies of publication 94-S titled "Synopsis of the Oklahoma Comprehensive Water Plan" dated January 1980.

In 1974, the Oklahoma legislature assigned the Oklahoma Water Resources Board the task of designing a statewide plan to meet the current and long-range water needs of the entire state. The need for a statewide plan recognized the state water problems which included: (1) depleting groundwater supplies, (2) increasing M&I needs, (3) inadequate distribution system, (4) water quality, and (5) flooding.

The plan was developed pursuant to relevant state and Federal legislation, policy and guidelines, setting forth the following goals:

(1) To promote economic opportunity and development.

(2) To preserve and enhance the environment.

(3) To protect lives and property from floods.

(4) To expand agricultural production and agribusiness activity.

(5) To develop recreational potentials.

(6) To maintain and improve water quality.

(7) To encourage water conservation.

(8) To place excess and surplus water to beneficial use.

(9) To encourage and provide for public participation in water resources planning.

The presentation also included information on regional water development plans, water conveyance systems, considerations related to future development, cost-benefit information, and conclusions. Details of these items have not been presented in these minutes but may be found in the above referenced publication 94-S.

7. Sub-Topics.

a. Arkansas River Basin Master Manual. Mr. Charles Sullivan, Corps of Engineers, SWD, reported that the Arkansas River Basin Water Control Master Plan is in final form and is scheduled for printing in June 1980. The manual has been a joint effort and will be submitted jointly by the Tulsa and Little Rock Districts to SWD for approval. After the manual has been approved and forwarded to the Office of the Chief of Engineers, copies will be available, upon request, by others who have an interest in the plan of regulation for the Arkansas River Basin projects. This plan is the result of efforts which began in late 1973. This update of the System Regulation Plan was brought about primarily because of the energy crisis, flow regulation requirements to better serve navigation needs particularly following large rises, and the effectiveness of the flood control system being reduced in recent years because of the loss of channel capacity in the vicinity of Van Buren, Arkansas. During this study period, the projects have been regulated under several interim plans.

b. Van Buren Land Acquisition Progress. Mr. Ross Copley reported on the progress of this activity. A study was made to determine alternative ways to restore the capabilities to operate at about 150,000 cfs in the Van Buren reach. The study indicated that probably the best way to maintain this capability was to buy flowage easements on the land that would be flooded for increased duration. Net damage areas were defined and located. These were areas that were not being benefited by project operation and were being damaged due to the increased flow duration. There are about 4500 acres of this land. Little Rock District will prepare the real estate DM and hold public meetings to explain the acquisition of flowage easements to the local interest. The schedule is for the real estate DM to be completed by July 1980, hold public meetings in September 1980, and start acquisition of flowage easements in October 1980. However, actual acquisition will be dependent on availability of funds.

c. Memo of Understanding, SWPA and Corps of Engineers. Mr. Coomes reported that in January 1977 there was quite a conflict between SWPA (the power marketing agency) and the Corps regarding management of the power storage in the Corps projects. Following that, SWD was instructed by the Chief of Engineers to negotiate a memorandum with SWPA to clarify the role of the agencies in the case of the storage. This has been done and at the staff level the various parties are satisfied with the document. However, the policy people in the Washington level still have some concern over the authority of the agencies under the condition of declaration of a power emergency. They want to be assured that an emergency cannot be declared as a result of shortages resulting from marketing considerations. It is hoped that these differences can be resolved by fall. After the memo is signed, the detailed operating criteria will be worked out.

d. Status of the Water Control Data System. Mr. John R. Parks, Corps of Engineers, SWD, reported that since the meeting last year the Master Plan for the system had been approved by the Chief of Engineers Office. This gave us the authority to begin detailed design of the system and request funding. We are currently preparing design documents for submission to the

Chief's office and plans are to go on the street for bids on the ADP portion of this system this fall. The completion of automation of the data collection and processing is scheduled for FY 1984.

e. Status of Arkansas Hydropower Study. Mr. Coomes reported that we have authorization to review the installation of hydropower facilities at all of the Arkansas River Locks and Dams that presently do not have these facilities. The study approach was to take the Murray Lock and Dam in the Little Rock District and W. D. Mayo Lock and Dam in the Tulsa District first. The studies are to consider that these will be run-of-the-river operations. The units being evaluated are bulb units of about 6 MW. The capacities of the projects are looking like about 25-50 MW. The studies began in October 1979 and draft survey reports are expected to be completed in August 1980 with the final survey report complete in October 1980. The earliest potential construction start would be 1982.

f. Protection of Water for Navigation Purposes. Mr. Coomes reported on the current Corps position concerning the protection of water for navigation and power. It is the conclusion that, of the Corps legal staff, that the agency may not file for a water right for navigation nor power water. This is prohibited by the O'Mahoney-Milliken Amendment to the Flood Control Act of 1944. The Corps may, however, prevent water withdrawals when access is required across Corps lands or if such access is granted may require a water withdrawal contract. The Corps policy on granting access to water users is not totally resolved at this time.

ATTENDANCE LIST

Arkansas River Basin Coordinating Committee
16 April 1980

	Name	Organization	Telephone No.
1.	Terry Coomes, Chairman	Corps of Engineers, SWD	FTS 729-2385 COM 214-767-2385
2.	Charles Sullivan	Corps of Engineers, SWD	FTS 729-2388 COM 214-767-2388
3.	John R. Parks	Corps of Engineers, SWD	FTS 729-2387 COM 214-767-2387
4.	David R. Brown	Corps of Engineers, SWD	FTS 729-2384 COM 214-767-2384
5.	Walter B. Gallaher	Corps of Engineers, SWD	FTS 729-2303 COM 214-767-2303
6.	Kenneth L. Waldie	Corps of Engineers, SWD	FTS 729-2431 COM 214-767-2431
7.	Jack T. Chowning	Corps of Engineers, SWD	FTS 729-2432 COM 214-767-2432
8.	Carroll Scoggins	Corps of Engineers, TD	FTS 736-7208 COM 918-581-7208
9.	Ross Copley	Corps of Engineers, TD	FTS 736-7669 COM 918-581-7669
10.	Richard G. Hunter	Corps of Engineers, TD	FTS 736-7858 COM 918-581-7858
11.	William E. Isaacs	Corps of Engineers, LRD	FTS 740-6231 COM 501-378-6231
12.	Arthur Martin	Federal Energy Regulatory Commission	FTS 334-2633 COM 817-334-2633
13.	Tom Dennis	Soil Conservation Service	FTS 740-5444 COM 501-378-5444
14.	Bill Seth	Dep't of the Interior - Water & Power Resources	FTS 728-9465 COM 806-378-5465
15.	Oscar E. Hembree, Jr.	Southwestern Power Administration	FTS 736-7225 COM 918-581-7525
16.	Mike Melton	Oklahoma Water Resource Bd	405-271-2520
17.	David L. Olschewsky	Environmental Protection Agency	FTS 729-3274 COM 214-767-3274
18.	Alan D. Fortenberry	Arkansas Soil & Water Conservation Commission	COM 501-371-1611

MINUTES
10th Annual Meeting
Trinity River Basin Water Management Interests

1. The 10th annual meeting of the Trinity River Basin Water Management Interests Group was held 22 April 1980, in Room 6E South, in the Dallas City Hall, in Dallas, Texas. Thirty-five individuals representing 19 organizations attended. Copies of the roster and agenda are attached.

2. Mr. R. H. Berryhill, Chief of the Engineering Division, Southwestern Division (SWD), Corps of Engineers, opened the meeting. He welcomed the attendees and explained for the benefit of those present for the first time that the group was formed in 1971 as a means of bringing together the various organizations having an interest and responsbility in the development and management of water resources in the Trinity River Basin. He explained that the Corps acts as a coordinator, supplying administrative support for the organization. He thanked the Dallas Water Utilities for hosting the meeting and introduced Mr. Taylor, Director of Dallas Water Utilities.

3. Mr. Taylor welcomed those present and thanked the Corps for pioneering the group and keeping it together. He stated that we in this area are fortunate that our predecessors had the foresight to develop long-range plans for water resources development in the area, and we need to continue this effort so those that follow us will be just as fortunate.

4. The chairman, Mr. Terry Coomes, reviewed the minutes from the 1979 meeting, mentioning specific items to remind the group of the status of certain projects and some things that were expected to happen between then and now. He introduced those present, then called on the representatives of the two Corps of Engineers Districts with responsibilities in the Trinity Basin to report on the status of their projects.

a. Mr. Bill Wooley, Galveston District, stated the draft report and EIS on the reconfigured Wallisville project were circulated in 1979 and comments are being processed. Major comments concerning the esturine inflows, quality of impounded water, sediment trap efficiency and its effect on marsh below the project, the recreation potential of the shallow reservoir, water supply benefits, and yield estimates. Final report and final EIS are targeted for July 1980. Other activities during the past year were:

(1) Salinity modeling of marsh area in the Trinity River delta.

(2) An archeological assessment of the Wallisville area.

(3) Data were obtained for predicting the quality of water in Wallisville Reservoir.

b. Mr. Cecil McFarland, Fort Worth District, reported on all Corps of Engineers projects within the Fort Worth District portion of the basin.

(1) Through last year, the nine existing projects have prevented flood damages of $540 million, compared to an initial cost of $106 million.

(2) Lakeview Dam. Construction of the outlet works and embankment was started in December 1979 and is scheduled for completion in November 1982. Real estate acquisition was about 50 percent complete as of January.

(3) Aubrey Dam. Negotiations with the cities of Dallas and Denton for the water supply and recreation contracts have been completed. As soon as the contracts are signed, funding requests can proceed.

(4) East Fork Channel Improvement. Increment I construction is scheduled to begin in July 1981 and be completed in December 1982. Increment 2 is still inactive.

(5) Cooper Lake. This project was transferred from New Orleans District to Fort Worth District in September 1979 and although not in the Trinity Basin, a large portion of the water supply will come into the basin. The EIS is scheduled for completion by the end of 1980. Then, hopefully, the project will be placed back in an active construction stage.

(6) Roanoke Lake. No funds have been appropriated for advanced engineering and design. Continued development in the area may result in an unfavorable benefit to cost ratio.

(7) Elm Fork Floodway. Design work was suspended in 1973 because of differences of opinions between municipalities regarding the extent and alignment of channels and levees and the amount of environmental and recreational enhancement.

(8) Duck Creek Channel Improvement. Work is still halted due to lack of assurances by a local sponsor.

(9) The four remaining projects, the multiple purpose channel, Tennessee Colony Lake, the West Fork Floodway, and the Dallas Floodway Extension have been combined into what is called the "Trinity River Project." Drafts of the Phase I General Design Memorandum and Environmental Statement were released in August 1979 with public meetings held in September. Additional studies are underway and the final reports are scheduled for the fall of 1980. Mr. McFarland provided details of current plans for each element of the "Trinity River Project." Current studies indicate navigation is no longer feasible above Liberty, Texas.

c. Dennis Baker asked the status of maintenance dredging for the existing navigation channel below Liberty. Bill Wooley said the maintenance funds are available, but he does not have a timetable for this work.

5. Mr. Bill Hilliard of the Tarrant County Water and Improvement District No. 1 made a presentation on the Development of the Richland Creek Reservoir Site and other items.

a. In October 1979 Tarrant County Water and Improvement District (TCWID) sold a $342.7 million bond issue for financing the construction of the Richland Site, the first phase construction of the pipeline back to Tarrant County and for land acquisition but not construction on the Tehuacana site. The Tehuacana site has been deleted from the initial plan of development because of the lignite coal deposits. The final hearing on a state water permit will be held in Austin on 13 May 1980. Local organizations have been formed, both for and opposed to the development. Final design work is underway, and land acquisition is progressing. About 8,080 acres, or 16 percent of the 50,000-acre total needed for the project, have been purchased and negotiations are underway for an additional 15,000 acres. Contracts have been made and negotiations started with railroads, oil and gas operators, pipeline operators, electric utilities, state highway department, counties, cities, small school districts, and others in the area. One of the major conflicts is with oil and gas production in the area. Recent oil price increases have made it worthwhile to raise old shallow wells rather than shut them down; therefore, many more wells than originally anticipated will have to be raised and kept in service. There is a considerable amount of new exploration in the Richland bottoms.

b. The 404 permit consideration period is now estimated by the Corps to be a minimum of 700 days on major dams which will take initial construction into late 1981 or early 1982. Other concerns are the data costs, archeological and environmental surveys, and fish and wildlife's mitigation which could add half again the cost to develop the project. We are determined to build this project as close to its original schedule as possible which calls for a lake full of water and, if needed, the first phase of pipeline in late by 1988.

c. The Cedar Creek Lake pipeline expansion is well underway but behind schedule.

6. Mr. Dennis Baker, Southern Regional Manager for the Trinity River Authority (TRA), made two presentations - the first on Hydroelectric Power at Lake Livingston and the second on Lake Livingston Yield Studies.

a. Hydroelectric Power at Lake Livingston.

(1) During the original planning and design of Lake Livingston, it was thought that hydroelectric power development would not be economically feasible. However, dramatic increases in fossil fuel costs and improved technology making low-head hydropower more efficient have generated a new interest in hydropower development at Lake Livingston. TRA and Gulf States Utilities contracted for a feasibility study of the installation of a hydroelectric power plant at Lake Livingston. The study used a monthly routing of historical flows using the period 1941-1978. Basic assumptions of the study were:

(a) The only economic benefit would be a fuel cost savings of 26 mills per killowatt hour (kwh) (2.6 cents/kwh).

(b) Lakeview, Aubrey, and Wallisville Dams would be in operation by 1985, Richland Creek by 1995, and Tennessee Colony would not be constructed.

(c) Water release procedures from Livingston would not change because of the hydro developments.

(2) The completion of Wallisville will be detrimental to the development of hydropower at Livingston because minimum release requirements will be reduced from the present 1500 cfs to about 750 cfs. The upstream reservoir development enhances the project because reduced flow fluctuations result in increased plant utilization. All flows over 12,000 cfs are wasted. Tennessee Colony Dam, if built, would further enhance the power development. Also, the city of Houston increass the utilization of its portion of the water supply storage (76 percent), the average annual energy will increase. Therefore, the assumptions resulted in a conservative estimate of economic benefits.

(3) Because of the frequency and duration of low flow releases, it was determined that the turbines will have to employ variable pitch runner blades and adjustable wicket gates so that they can operate at 80 percent efficiency even at only 20 percent of capacity. This will allow some generation at releases as low as 750 cfs. Both Kaplin and Horizontal shaft tube type units are being considered. The plant would be highly automated requiring only a minimum number of personnel on one shift per day, thus reducing O&M costs.

(4) Results of the study show that an installation of 4-15 mw units would be the most feasible. Based on 1982 dollars, the estimated cost for tube-type units is approximately $73 million. Economic life was assumed to be 50 years and debt service 35 years. Benefit-cost ratios computed for 7 and 10 percent bond interest rates were 2.51:1 and 1.55:1, respectively. The plant factor for the first unit was computed to be 0.69 or the unit could operate at capacity 69 percent of the time. Plant factors for additional units fell off rapidly but were high enough to justify three more units. Additional units are not feasible because of the small utilization.

(5) The installation of a hydroelectric power plant of 4-15 mw units at Lake Livingston appears to be economically justified for bond interest rates up to 10 percent used in the analysis. Present permits will have to be altered and additional permits acquired. More detailed engineering studies will have to be conducted, but it appears that a hydroelectric power plant will be installed at the lake.

b. Lake Livingston Yield Study. The TRA and the city of Houston will, in the near future, contract for a study to determine the yield of Lake Livingston for various combinations of water management projects and practices. The study contracts the following three tasks:

(1) Review existing flow data for the Trinity River Basin, develop a computer management system, review and assess methodologies for adjusting historic streamflow data for existing watershed conditions, develop a

continuous set of streamflows for the period 1941-1978, including streamflows for ungaged tributaries, and prepare and submit a report on the above.

(2) Computerize all information gathered in subparagraph 6b(1) above to evaluate various computer models capable of simulating various combinations of new reservoirs and water facilities, changes in streamflow, changes in interbasin transfers and diversions, changes in water rights, changes in operating procedures, and other changes affecting the hydrology of the entire basin. Compile and compare background data and information to exercise the model to be selected in each of the following three scenarios of basin development and water demand conditions:

(a) "Development of conditions which existed during the period of streamflow record (1941-1978) used in this analysis." We are talking about reservoir, diversions, appropriate rights, and things of this nature. Here we are trying to determine what the yield of Livingston is now, under current conditions.

(b) "Development of conditions represented by the latest estimates of the 2010 development and water demands."

(c) "Development of conditions used as the basis for determining the yield of Lake Livingston originally, as issued in permits 1970 and 1974." (Permit 1970 is the permitted water rights for Lake Livingston, and 1974 is the permitted water rights for Wallisville).

(3) "Calculation of yield in critical periods for existing and proposed reservoirs during the period of record available. Calculation of the effect of such reservoirs on Lake Livingston as authorized in Permit 1970-1974 prior to certified filing of permits and contracts. Calculations of the system yields for existing of proposed reservoirs in various combinations. Calculations of the effects of various operating procedures for existing and proposed reservoirs and combinations." We are again talking about yield during critical periods of low flow for proposed reservoirs. It will have to address the impact that any proposed reservoir would have on any other reservoir within the basin. To give you an idea of the magnitude of the study, we have set an upper limit of about $250,000. The study will begin shortly and is scheduled for completion on 1 February 1981. The simulations will be daily during critical flow periods and monthly otherwise.

7. Update on the 208 Program Activities.

a. North Central Texas Council of Governments (NCTCOG).

(1) Mr. John Promise of NCTCOG said their organization is one of three designated Water Quality Planning Agencies with the Trinity River Basin and, as such, is required to develop an annual water quality management plan. These plans are used as the basis of decision on permits and construction grants in the region. The 1980 plan has been submitted to the state and EPA for approval. Within the Dallas-Fort Worth area there are eight reservoirs and seven stream segments. The lakes continue to meet standards, but the

stream segments, particularly the East Fork, West Fork, and main stem, continue not to meet water quality standards for their designated purposes. Preliminary sampling of metals and pesticides has shown the need for more detailed studies in that area. A continuous monitoring system for river water quality has been implemented and analysis of the first year's data has revealed new information on overall conditions and during peak river flow events.

(2) The regional sewage improvement program begun in the early 1970's will be completed in 1981. Over the last 3 years, there have been significant improvements in the sewage treatment plants with BOD loadings being reduced by 40 percent. When completed, more than 99 percent of the region's domestic raw sewage will be treated at advanced secondary levels.

(3) An areawide assessment of pollutant loadings shows nonpoint sources to be significant. The assessment indicates that as a result of the sewage improvements during the past 3 years, average annual BOD loadings from urban and rural nonpoint sources runoff now exceed the treatment works loadings. When the advanced secondary levels are attained, annual nonpoint source loadings are estimated to be almost three times greater than point source loadings for the entire region. NCTCOG has generated a new set of regional population forecasts for the year 2000. These have been approved by the state and EPA for use in regional planning. A detailed water quality investigation of Lake Ray Hubbard was just completed, and investigations of water quality in Lake Arlington and Lake Lavon will begin this year.

b. Dr. Richard Browning, Trinity River Authority (TRA), explained the division of geographical areas of responsibility for the 208 program. TRA's area of responsibility is in the "nondesignated" area of the basin which includes the area north of Dallas-Fort Worth and south of Dallas all the way to the mouth. The 208 program in the nondesignated area included a considerable effort in facility planning, broad preliminary level nonpoint source load assessment, and a public participation program. The area plan was submitted to the state in October 1978. It was reviewed and certified by the state in December 1978. Conditional approval was given by EPA in November 1979, and TRA responded to EPA's comments in February 1980. The scope of the next phase of the 208 planning effort has been defined by the state and EPA, and contract negotiations are underway between the Authority and the state to initiate this nondesignated area 208 program planning. It is similar to the last effort in that it includes a major facilities planning portion and nonpoint source work this time focusing on sampling and data analysis of toxic type parameters in the main stem from Dallas downstream to Lake Livingston.

8. Mr. Tom Taylor of Dallas Water Utilities spoke on the following subjects:

a. Wholesale Treated Water Rate Agreement between Dallas and customer cities. As a result of a recent settlement, water rates were reduced 12 percent. All customer cities have signed agreements except the city of Farmers Branch which is asking for an additional 35 percent reduction. The basis of the agreement is a two-page "rate principles" document, written in layman's

language, which will be used over the next 30 years for setting wholesale water rates. It sets out responsibilities of the customer cities and the city of Dallas, and sets the initial rates to be charged. The rate principles can be reviewed and changed at the end of 10 years at the request of either Dallas or one of the customer cities. Rates are based on a volume charge and demand charge. The volume charge includes a portion of the cost of reservoirs presently used, transmission, treatment, and other operation and maintenance costs. The demand charge is related to the peak day usage and includes all other joint system costs, planning, construction, debt repayment, etc. The demand charge is high and should encourage maximum efficiency of operation. Customers who have their own storage facilities to even out loads will get an end result rate much lower than those who have no storage and are making no effort to do so. Rates will be reviewed annually and changes, if necessary, will be based on projected costs for the middle of the rate period. Costs for new system projects will be divided 74 percent to Dallas and 26 percent to the customer cities. This percentage can be changed when rates change, based on projected usage.

b. Lake Ray Hubbard Reservoir operating policy. Dallas' five reservoirs have been operated in an economic dispatch mode, meaning taking from the lower cost reservoirs first then cascading gradually to the more costly sources. Generally, this means overdrafting from gravity sources (Grapevine and Lewisville) first, then shifting to more costly sources. This operation meant that Lake Ray Hubbard would be pumped fairly heavily about the midpoint of a drought before going to the more costly source at Tawakoni. Operation under this plan resulted in about a 9-foot drawdown of Lake Ray Hubbard during the drought of 1977-78. Recreation interests complaints about the drawdown prompted the City Council to initiate a study to determine an operating plan better suited to recreation. The study recommended changing the operation as follows:

(1) Continue present practice to draw from the lower cost sources first, i.e., Grapevine and Lewisville.

(2) Next, pump maximum need from Lake Ray Hubbard until the level drops 2 feet to elevation 433.5.

(3) For the next 1.5 feet, maximize Tawakoni pumpage off peak, i.e., pump at night and on weekends when electric energy rates are lower.

(4) Once Hubbard drops below elevation 432.0, Tawakoni will be used to the fullest extent possible 24 hours per day.

Some water must still be drawn from Lake Ray Hubbard and other sources to meet daily needs. Pumpage costs will be increased on the average of about $150,000/year, but during a drought year, it could be two to three times that much.

c. Service area.

(1) The regulated utilities all have well defined service areas registered with the Public Utilities Commission or another appropriate agency.

Dallas Water Utilities does not. A strategic planning study was just concluded to develop reasonable guidelines for who can and should be served and under what rules.

(2) The city of Dallas has always taken a stewardship view of our water resources. Rights have been granted by the state with some understanding that it will be made available to others. The planning area was delineated taking into account what other water districts do. The area served by Tarrant County is the western boundary, and the areas served by North Texas Municipal Water District are the northern and eastern boundaries. This basically includes all of Dallas and Dallas County not presently served by other utilities, Denton County east of Denton Creek not serviced by the city of Denton, Collin County west of the North Texas Municipal Water District service areas (generally the Elm Fork Basin), and all of Cook and Grayson Counties within the Elm Fork Basin.

(3) He also commented that construction on the second line from Lake Tawakoni was underway and will be completed in 1981 and that the cities of Dallas and Denton are finalizing a contract with the Federal Government so that construction can begin on Lake Aubrey. He said Aubrey water would be needed by 1995.

9. Mr. Gene Janes of the US Soil Conservation Service (SCS) presented a report entitled "Water-Yield Effects of Headwater Reservoirs, Trinity River Basin, Texas."[1]

a. Past studies have left some question as to the effect of many small headwater reservoirs on the yield of larger downstream reservoirs in this area. This study is an attempt to evaluate the effect in one specific area, the Elm Fork of the Trinity River above Lewisville Reservoir. The study is part of a three-part study to determine the effects of the small floodwater retarding structures on water yield, flooding, and sedimentation.

b. The basin was broken into five subbasins for the study, four gaged and one ungaged (the local inflow subbasin), and groups of small reservoirs were consolidated into composite reservoirs which are hydrologically equivalent to those replaced. The University of Texas Watershed Simulation Model, a continuous soil-moisture accounting computer program developed from the Stanford Watershed Model IV, was employed. In this particular model, 20 parameters closely associated with measurable characteristics are used. Two sets of parameters were developed for each of the five subbasins in the watershed, one set of preconstruction, and the second for post-construction conditions. The model was calibrated for preconstruction conditions using gaged data for one wet and two dry years, then checked using other years of record prior to 1954. The post-project calibration was based on 1972 conditions using 1 1/2 years of records and then extrapolated to account for full basin development. The 1972 conditions included 110 structures with 12,980 acre-feet of storage controlling about 18 percent of the basin and assumed no sediment in any of the reservoirs.

[1]Technical Report CRWR-169 by the Center for Research in Water Resources of the University of Texas at Austin.

c. Statistical correlations between the preconstruction and post-construction period were good for all subbasins except the local inflow area which does not have gaged records. The computed and recorded streamflow did not agree exactly, so a "volume adjustment factor" (the ratio of the recorded volume to the simulated volume) was applied as a multiplier to the computed streamflow to make them match. Studies were done both with and without the volume adjustment factors.

d. Monthly streamflows were computed for regulated (all SCS structures in place) and unregulated (no SCS structures) conditions both with and without the volume-adjustment factors, thus producing four sets of data for each subbasin. Monthly inflows to Lewisville Reservoir were determined for the four conditions above by summing the monthly subbasin flows. The effects of the structures on total inflows to Lewisville appear insignificant during high flow conditions. However, when the average monthly runoff is less than 0.02 inches, runoff increased when the volume-adjustment factor is used and decreased when it was not.

e. A reservoir operation study was done for critical drought of record (October 1950 through March 1957) to determine the effect of the structures on the safe yield of Lewisville Reservoir. The reservoir was assumed to be full initially, and a constant draft was used for each month of the simulation. Yields for the four conditions were determined using successive interactions with various draft rates. Results suggest the safe yield under regulated conditions is 4 percent more than under unregulated conditions when the volume adjustment factor is used, and it is 7 percent less when the volume adjustment factor is not used. These changes are small in relation to data and modeling uncertainties and to the natural rainfall-runoff variations.

f. Based on these studies the SCS feels the actual percentage is somewhere in between those two figures but, in either case, the small SCS structures have a very small impact on yield from a large impoundment.

10. Mr. Coomes invited all attendees to make comments concerning topics of interest to the group. Brief statements were made as follows:

a. Doland McKnight and Whitney Ingram, North Texas Municipal Water District. Mr. McKnight said North Texas has just gotten into the solid waste business and is now operating the former Plano-Richardson landfill. He also said they are presently operating 11 wastewater plants, two more than last year, and are building another which will go into operation in May.

b. Mr. Ingram stated that on the water side, a new combination 60- to 96-inch line has been completed into Plano from Lake Lavon which provides a pumping capacity of a little over 200 mgd.

c. Mr. John Croslin, NOAA/NWS, stated the River Forecast Center has the capability to forecast reservoir inflows, steamflows, and stages on a 24-hour/day basis in addition to public forecasts. The AFOS communication system is moving slowly but should be in within the next year.

d. Mr. Sam Scott, TRA, reported that the regional water supply system serving Huntsville should be completed in June, the Livingston water supply project should be completed in September, and their Regional Wastewater Plant should be fully operational late this year. Expansion of the Tarrant County Water Supply Project to serve Collieville, Grapevine, and North Richland Hills is underway. Their new office facilities will be completed in June 1980 and they will welcome this group next year. The Authority's Board of Directors will be considering the Trinity River Project local assurances in June of this year.

e. Charles Sullivan, SWD RCC, gave a brief update of the new hydrological data collection system. He also mentioned that about 40 GOES data platforms should be installed in the basin by the end of this year.

f. J. L. Robinson, city of Fort Worth, said they have recently completed a master water plan through the year 2000, including a mathematical model of the entire distribution system. The lakes on the West Fork are low and pumping has started from Cedar Creek. He anticipates increasing pumping to 80 mgd this summer. With this much water coming from Cedar Creek, the city will have to operate part of the distribution system in a "reverse-flow" mode from the east going through different pressure planes which could cause some system problems. Modifications to the Village Creek Sewage Treatment Plant should be completed in June.

g. Jimmy Hill, SCS, said they have completed the environmental statement for the remaining project type work including structures and critical area treatment (erosion control) work in the upper Trinity Basin.

h. Gene Gann, USGS, reminded the group of USGS stream data collection program including water quality. He mentioned they are collecting water quality data from four, four-parameter monitors, 35 periodic stream sites, and seven lakes in the North Texas area. In conjunction with remote sensing program, USGS has a national pilot study underway evaluating the use of satellite data for collection, storage retrieval, and processing of streamflow records. Current plans are for the installation of 30 satellite gages in the Trinity Basin this fiscal year and another 15 in FY 1981.

Mr. Terry Coomes announced the end of the regular meeting session. He thanked the city of Dallas for providing the facilities and for their hospitality.

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AGENDA

Tenth Annual Meeting
Trinity River Basin Water Management Interests

Date: 22 April 1980
Time: 9:30 a.m.
Place: Room 6E South, Dallas City Hall
1500 Marilla Street
Dallas, Texas

Topic

I. Introduction - Mr. Coomes and Mr. Berryhill, Corps of Engineers, SWD

II. Welcome - Mr. Thomas Taylor, Director, Dallas Water Utilities

III. Minutes and Comments on 1979 meeting - Mr. Coomes, Corps of Engineers, SWD

IV. Update on Status of Corps of Engineers Trinity River Projects - Galveston and Fort Worth Districts

V. Development of the Richland Site - Bill Hilliard, Tarrant County Water Control and Improvement District No. 1

VI. Hydroelectric Power at Lake Livingston - Dennis Baker, Southern Regional Manager, Trinity River Authority (TRA)

VII. Lake Livingston, Yield Studies - Dennis Baker, Southern Regional Manager, TRA

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VIII. Update of 208 Program Activities - Richard Browning, Trinity River Authority and John Promise, North Central Texas Council of Governments

IX. Wholesale Treated Water Rate Agreement between Dallas and Customer Cities - Mr. Thomas Taylor, Director, Dallas Water Utilities

X. Soil Conservation Service Projects in the Upper Trinity River Basin - Study Results - Gene Janes, US Dep't of Agriculture, Soil Conservation Service

XI. Comments and General Discussion

a. State Agencies
b. Municipalities
c. Water Districts
d. Private Organizations
e. Federal Agencies

XII. ADJOURN

ATTENDANCE LIST

TRINITY RIVER BASIN
WATER MANAGEMENT INTERESTS MEETING

Room 6ES, Dallas City Hall
22 April 1980

Name	Organization
John F. Kubala	City of Arlington
Carl Lay	City of Carrollton
Thomas L. Forrest	The Colony Municipal Utility Dist. No. 1
Thomas E. Taylor	City of Dallas
Roger Proza	Dallas Water Utilities
Matalyn Harp	Dallas Water Utilities
Bob Nelson	City of Denton
J. L. Robinson	City of Fort Worth
Dolan McKnight	North Texas Municipal Water District
E. H. "Whitey" Ingram	North Texas Municipal Water District
Bill Hilliard, Jr.	Tarrant Co. Water Control Imp. Dist. No. 1
Chuck Whaylen	Tarrant Co. Water Control Imp. Dist. No. 1
Dennis D. Baker	Trinity River Authority
Richard Browning	Trinity River Authority
Sam Scott	Trinity River Authority
John Promise	North Central Texas Council of Governments
William A. White	Texas Department of Water Resources
Jay Kuykendall	Texas Soil and Water Conservation Board
Verlie Throckmorton	Dallas Power and Light Company
James C. Collins	Dallas Power and Light Company
Robert O. Almond	Texas Power and Light Company
Tony DiRosario	Environmental Protection Agency
Bonnie J. DeVos	Environmental Protection Agency
John Croslin	National Weather Service
E. E. (Gene) Gann	US Geological Survey, Fort Worth
Jimmy Hill	Soil Conservation Service
Gene Janes	Soil Conservation Service
William G. Wooley	Galveston District, Corps of Engineers
Cecil J. McFarland, Jr.	Fort Worth District, Corps of Engineers
Dick Berryhill	Southwestern Division, Corps of Engineers
Samuel N. Aiken	Southwestern Division, Corps of Engineers
Terry Coomes	Southwestern Division, Corps of Engineers
Charles Sullivan	Southwestern Division, Corps of Engineers
David Brown	Southwestern Division, Corps of Engineers
Harold Green	Southwestern Division, Corps of Engineers

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